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CONTENTS

Saving the Parrakeets ..... *C. T. Metzger* 217
The Plumage of the Pine Siskin ..... *Thomas T. McCabe* and *Elinor Bolles McCabe* 221
Life History of the Red-bellied Hawk (with 5 ills.) ..... *James B. Dixon* 228
Yellowstone's Winter Birds (with one ill.) ..... *M. P. Skinner* 237
The Status of the Cardinal in California ..... *Alden H. Miller* 243
FROM FIELD AND STUDY
Bears and Birds' Eggs ..... *William Rowan* 246
Some Winter Records from Montana ..... *Winton Weydemeyer* 246
California Black Rail in Los Angeles County ..... *Joseph Ewan* 247
Unusual Singing of the Eastern Chewink ..... *H. A. Allard* 247
Field Notes on Certain California Birds ..... *S. F. Blake* 249
Summer Record of the Cedar Waxwing in Yosemite Valley ..... *H. C. Bryant* 250
A Record Set of Eggs of the Golden Eagle ..... *Milton S. Ray* 250
Bird Notes from Santa Catalina Island ..... *Don C. Meadows* 250
A Mid-winter Anthony Green Heron ..... *Laurence M. Huey* 251
The Lichtenstein Kingbird on Vancouver Island ..... *F. Kermode* 251
The Nuptial Display of the Buffle-head ..... *Theed Pearse* 251
Sixth Record of Harris Sparrow in California ..... *G. L. Foster* and *Grace E. Foster* 252
Rufous Hummingbird in the Oklahoma Panhandle ..... *Ralph C. Tate* 252
Reddish Egret on Los Coronados Islands, Mexico ..... *Jack C. von Blocker, Jr.*, and *Samuel G. Harter* 253
Band-tailed Pigeon Nesting in Arizona in September ..... *Chas. T. Vorhies* 253
Do Willow Downy Woodpeckers Ever Drill in Tree-bark? ..... *J. Grinnell* 253
Generic Re-assignment of Morphnus daggetti ..... *Loye Miller* 255
EDITORIAL NOTES AND NEWS 256
MINUTES OF COOPER CLUB MEETINGS 258

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SAVING THE PARRAKEETS

By C. T. METZGER

FOR SOME YEARS the writer has noticed with alarm the ever decreasing numbers of certain species of foreign birds that had been more or less common in the past, especially the Australian parrakeets which at one time were fairly plentiful in the American market. Many species that were common twenty years ago, today are never heard of, or at least very seldom and then at prices that are staggering.

Some four years ago I began an inquiry, to learn, if possible, the cause of this decrease. The investigation included such species as: The Blue-wing Grass Parrakeet *(Neophema venusta)*, the Bourke Grass Parrakeet *(Neophema bourkei)*, the Elegant Grass Parrakeet *(Neophema elegans)*, the Yellow-rumped Parrakeet *(Platycercus flaveolus)*, the Turquoisine Grass Parrakeet *(Neophema pulchella)*, and the Pileated Parrakeet *(Porphyrocephalus spurius)*. These species and a number of others while not common were usually to be had as late as 1910; now it is almost impossible to obtain even single specimens.

Many letters were exchanged with aviculturists, dealers and fanciers in all parts of the world, and I finally came to the conclusion that, like our own Carolina Parrakeet and the Passenger Pigeon, they were fast becoming extinct for various reasons and that unless steps were taken for their preservation it was only a question of a short time before they would be only a memory.

About this time I was fortunate enough to get in touch with the Marquess of Tavistock, Havant, England, who was also interested in this subject and who had been conducting experiments with Parrakeets for several years. He assured me that there was still a chance of saving some of these species if enough people could be interested who were willing to give their time and money to the undertaking. His idea was to collect as many pairs as possible and endeavor to breed them in movable outdoor aviaries, in a suitable climate and under the supervision of experienced aviculturists. At the same time he offered to donate for this purpose a certain number of birds from his own aviaries and, later, to add others as they appeared on the market.

The present writer lived for many years in California and, having bred nearly all the fast disappearing species at one time or another with considerable success, decided that if he could locate a few people who were interested sufficiently to give the experiment their time and attention there was at least a fighting chance of accomplishing something worth while. While California, especially the southern part, was selected by Lord Tavistock as ideal for the experiment, I am satisfied that there are many other states in this country equally suitable. Parts of Florida, Alabama, Louisiana, Arkansas, Oklahoma, and certain localities in Texas, cannot fail to prove

equally suitable. California was chosen for the reason that I had lived there for a number of years, and had bred many kinds of foreign and some native birds with considerable success.

An advertisement was accordingly inserted by Lord Tavistock and myself in two newspapers, explaining the situation. Unfortunately we made the mistake of saying that breeding stock would be furnished free of charge to those interested. The result was that letters began to pour in from people who had bred anything, from canaries and budgerigars to all kinds of foreign finches. Few seemed to know anything of the rarer Parrakeets, and it was quite a task to locate even a very few who could qualify. We finally selected half a dozen people, who appeared to measure up to our expectations; and I think no mistake was made in their selection.

The first birds reached Chicago from England in 1926, and after a few days rest, were forwarded to California. Since that time his Lordship has sent over some fifty birds. Every individual reached Chicago in first class condition excepting one, a male Turquoisine, that, unfortunately, died two days after arrival. The others were delivered in California safely and were at once distributed to the proper people. Since that time there have been some losses, as was to be expected, but not enough to prove discouraging. All losses, whether large or small, are disconcerting, especially when one considers the small available supply of birds and the expenditure involved. Lord Tavistock paid for some species more than three hundred dollars per pair.

Allow me further to explain the Marquess' scheme and how he thought it might be brought to a successful issue and thus save for future generations some of the most beautiful avian treasures the world possesses. The instructions given recipients of birds are as follows: Each breeding pair is to be placed in an individual aviary about 8 by 8 by 24 feet (or even larger), with suitable nesting logs, resembling those used by the birds in their native habitat, and fed as per instructions sent out by the Marquess. If Lord Tavistock's experience counts for anything (and he has spent more than fifteen years in experimenting with these birds) the best results are obtained by moving the aviaries to new soil once each year. It was also impressed upon recipients of the birds that none was to be sold under any consideration until at least the fourth or fifth generation had arrived; but young could and should be traded back and forth to prevent inbreeding; or young could be placed in the hands of new members of the organization for further propagation. After the fourth or fifth generation it is thought a sufficient number will be on hand to insure permanency of the species.

For a long time I was at a loss to account for the rapid disappearance of some of the species, but I think I can explain this fact by setting down certain conditions now existing in Australia. It may also be asked why America or some place other than Australia has been chosen for the experiment. In the first place, encroaching civilization is, in Australia as everywhere else, a big factor in the depletion of certain species; but the general opinion of people who live there is that this cause alone would not have been effective for many years to come, and only after a decided increase in population. This factor alone might not do more than drive the birds farther into the interior. It was also believed that some species might accustom themselves to the changed conditions and, though reduced to a certain extent, they would be in no immediate danger of extermination.

The chief cause of the threatened extinction of the Parrakeets under discussion is, first of all, destruction of the birds' natural food—seeds of grasses and other plants—by flocks of sheep which as every one knows destroy as much with their sharp hoofs

as they eat. Next in order are imported foxes and domestic cats running wild, the poisoning of grain by farmers (to rid themselves of the cockatoos that raid their crops) and the wanton destruction of hundreds and even thousands of Parrakeets by laborers on the railroads as a change of food from the constant diet of mutton. Brush fires are also responsible for many losses, while the European Starling, like the English Sparrow in this country, appropriates the best nesting sites.

Other enemies of the Parrakeets are the numerous birds of prey, such as hawks and owls. Every ornithologist knows that the "natural" enemies of the smaller birds rarely bring about their extinction. They merely maintain the so-called "balance of nature"; but once a species is reduced by any but natural causes, its fate may be sealed at the hands of its hereditary foes. Then again, a number of Parrakeets are largely terrestrial, especially some of those inhabiting the islands adjacent to Australia. Here rats, introduced from ships, have created havoc among these ground-living birds. Later, the mongoose, brought from India to destroy the rats that attack sugar cane and other farm produce, finished the lethal work begun by the rats.

Many people with whom I have corresponded and conversed seem to think that Australia is an ideal place for the aviculturist; but I have reason to doubt it. So far as I can learn climatic conditions are in many parts of that immense continent far from favorable for the raising of caged birds. Either the coldest weather or the hottest summer (with its suffocating dust-storms) kills off the choicest stock; or gales accompanied by cloud-bursts blow down trees onto the aviary roofs and crush or drown any birds that have not been liberated. I am also informed that at certain seasons of the year hawks arrive by the dozen and so terrify birds in the aviary that they break their necks or crack their skulls by dashing against the wires of the enclosures. Recently a measure has been adopted by the legislature prohibiting the exportation of birds as a protective measure, and yet the Australian government makes no serious effort to preserve at home those birds whose death rate seriously exceeds the birth rate.

While Lord Tavistock and I have so far confined our efforts to preserving a few Australasian and Fiji Island species, we can see no reason why the experiment could not be extended to many of our American species that are fast disappearing. I quote from a recent letter from his Lordship: "I do not think any country can possess a more priceless scientific treasure than a flourishing, breeding stock of interesting and beautiful creatures long vanished from their native haunts and found nowhere else in the world. . . . Americans have allowed the Passenger Pigeon, the Carolina Conure, and the Whooping Crane (the first of which certainly and the last two probably) to disappear, all of which could have been saved in confinement. It would be a fine thing if Americans could make amends for this mistake by saving what other countries are about to lose."

While the experiment with the Parrakeets has not been a failure by any means, even though no great results can be recorded so far, yet unless more people join us who are able and willing to assume a part of the burden, either in an active capacity, by the donation of birds, or by direct financial assistance, I am afraid all our efforts and Lord Tavistock's outlay will count for nothing. In three instances particularly has the lack of funds proved a handicap and hardship. Of the Turquoisine Parrakeets we have been able to secure only two male birds, and one of these has died. Of the Bourke we have one pair, but the hen is far from a satisfactory breeding individual and it is doubtful if she will ever breed. Of the Elegant, we have only two, one splendid cock and one hen which appears to be a cross of some kind and

hardly a fit mate for the cock. A few Bourkes reached England the other day (six birds I think) at five hundred dollars a pair, a price beyond our reach. Also a pair of Elegant was offered by an English dealer for six hundred dollars, and two pairs of Turquoisine at seven hundred and fifty dollars per pair, but even at these prices they would be cheap. I consider no bird "dear" unless it is in poor health. It must be remembered that the Bourke and Blue-wing Grass Parrakeets have hatched from three to five young at a sitting, and they usually have two and even three broods in a season. They may thus prove very profitable as an investment. As late as 1908 the writer raised seven birds from one pair of Turquoisines in one season and nine from the same couple the following year. Other species have done equally well.

But aside from the financial returns from the investment, what more can an enthusiastic aviculturist ask than the satisfaction of knowing that he or she has helped to preserve for posterity some of our most beautiful of birds?

I wish here to thank Dr. Casey A. Wood for his valuable assistance in preparing the present article.

Chicago, Illinois, March 27, 1928.

THE PLUMAGE OF THE PINE SISKIN

By THOMAS T. McCABE AND ELINOR BOLLES McCABE

OUR INTEREST in the plumage of the Pine Siskin *(Spinus pinus)* was first aroused in connection with banding, by certain peculiarities which our records of these birds showed. To review in detail their curious history at our station would be to wander too far from our subject. Suffice it to say that for three summers, in rapidly increasing numbers, they have abandoned the surrounding primeval forest for our small and remote clearing and grove of aspens. The attraction has always been some mineral food, relish, or medicament, natural or artificial. Ashes, deep blue clay from a cellar hole, salt, and newly-set Portland cement have all had their periods of favor.

Some idea of the numbers of the birds can be formed from the fact that last summer (1927) in a few midsummer weeks, with brief and intermittent periods of work, we banded 1214, with only 19 repeats. How many could have been caught but for the unlucky lapse of the band supply, it is hard to imagine. It is significant that these tastes are shared by other northern Fringillidae, though, to the limit of our experience, by no other group or species. Far more slowly the Crossbills, Redpolls and both Pine and Evening grosbeaks are finding the baits and feeding places of the Siskins, and are remaining in their neighborhood. An irritating fact, to the bird-bander, is that the spot now in favor is the upper and outer part of a very tall stone-and-cement chimney!

Since the habit seemed to be so restricted, it was natural to suppose that the long deprivations of the northern winter might explain the common taste among largely resident northern birds. Consequently we were surprised to find that almost ninety per cent of the siskins we trapped were, according to the usual descriptions, immature. Evidently, instead of restoring the jaded appetites of mature roisterers that had dined too long upon the abundance of the spruce, our wholesale condiments were being wasted upon mere fledglings, whose consuming effort of growth, scarcely completed, might have been expected to demand the substance and neglect the relish.

This naturally led to a sharp scrutiny of the accepted age-characters. Numerous inconsistencies at once arose, chief among them the frequent occurrence of both old white-tipped and new orange-tipped feathers in the same tract of molting wing coverts. We have not been able to pursue the history of the subject to its beginnings; but we find in the second edition of Coues' Key (1884): "Young birds have the markings diffuse, with a general buffy-brownish suffusion." Ridgway in his Birds of North and Middle America (part I, 1901) follows or agrees with this: Young "similar to adults, but wing-coverts tipped with buffy;" but he also adds "underparts often (but not always) tinged with sulphur yellow." Most recent manuals (Chapman, Taverner, Hoffmann) make no distinction between the immature and subsequent plumages; but F. M. Bailey (Handbook, 1916) says, "Young: upper parts mustard yellow tinged with brownish olive feathers streaked, except on belly; wing bands and patches brown." In the latter part of this description one wonders whether the word "brown" may not have been used to describe the wing-bars of very old skins, as it hardly applies to the bright orange-buff of the living bird.

The variable characters upon which any distinction in age would have to be founded are, in point of fact, (1) the dull white or bright orange-buff of the wing-

bars; (2) variation in the back from feathers with pale dusky centers and white margins to those with strong dusky, sometimes black, centers, and "mustard" margins; (3) presence or absence of yellow on the belly, varying from a warm, almost buffy, yellow, through the palest of lemon washes, to perfect dull whiteness; (4) the chest, and more rarely the flanks, may be warm buffy or even low red-orange, or any reduced degree of buff, both in area and intensity, down to plain white; and finally, (5) the belly is occasionally streaked longitudinally with strong dusky, more often lightly pencilled, and frequently immaculate. Care must be used to avoid confusing exposed dark bases with true streaking.

When the post-nuptial molt had been for some time in progress it occurred to us to attempt an analysis of the state of the plumage, both in regard to the above-mentioned variable characters and to the progress of the molt, of 100 birds, caught at random. We chose the following points for special observation and tabulation: For the molt, primaries, secondaries, tertials, tail, greater and middle coverts; for color, general color above and degree of yellow below. Unfortunately we did not at first realize the variability of the streaking and the buffy chest, but they were included later; and the total number of birds was raised to 150 to increase the amount of data on these special points. This accounts for the variable totals in the first table, and the number of "unobserved" symbols in the second, two-page table.

In regard to the molt, the tabulation of the individuals and tracts to show the facts most clearly, but without forcing the material to illustrate preconceived ideas of our own, was not easy. After much experimentation we decided to arrange the tracts from left to right horizontally in the order in which they begin to molt. This was ascertained by dividing the whole number into classes according to the number of tracts in process of molt at the time of examination, and observing in each group which new tract had been added. The results of this, or, of course, any other method, become somewhat uncertain when the least regular tracts are reached. As to the vertical order of individuals, all our evidence points to great regularity in the molt of the primaries, so that we decided to employ this tract as a kind of registering chronograph, conveniently attached to each living bird, and registering, through nine time-divisions (further divisible through the states of the immature feathers), the period since the molt had begun. An infinite number of individuals, placed in this order, should be equivalent to an equal number of observations of a perfectly average bird, and the general lines of movement in the single columns and across the whole sheet show, (1) the movement in each tract, (2) the sequence of tracts, and (3) the relations of the different tracts at any given stage of the molt. This belief in regard to the primaries, upon which a large part of our argument depends, was strongly substantiated by the great regularity in which the secondaries appeared when the tables were arranged in this way. It must be remembered that this method is used for purposes of comparison and has nothing to do with absolute time. Thus it is possible that the time-divisions may not be equal, that is, that the pace of the primaries may slow down as other tracts come in and demand their share of the vital reconstructive energy.

Most of the terms employed in the tables are self-evident, but perhaps a word of explanation may be needed in regard to the greater coverts, which are confusing and difficult to count. Their number is eleven. Most are unmistakable, each rooted directly upon the calamus of a secondary or tertial, but not corresponding with it in number, for the small outer covert which by position, color, form and imbrication unquestionably belongs to the tract, is rooted, not on the first secondary, but on the ninth primary or ninth primary covert, which latter is actually set between

the eighth and ninth primaries. Also the upper or proximal tertial carries two greater coverts upon or close to its insertion, of which the inner is shorter and weaker than the rest, in accord with its reduced functional importance in the work of flight. Thus the tract of the "greater secondary coverts" exceeds the secondaries and tertials themselves in number by two. It seems best to treat the tertials independently as such, rather than as secondaries, not only because their system of molt is perfectly regular and independent, but because, while rooted outside the elbow, they differ, with the occasional exception of the lower or distal, in not being attached to the ulna.

As a matter of fact it becomes possible, after some practice, to distinguish old feathers from new in most tracts by the depth and intensity of color, though the secondaries offer a common exception to this. In cases where the molt has not begun, or is completed, this sense, with the general condition of the plumage, color of the quills, etc., is of course sufficient for the necessary decision.

The symbols employed are as follows: 1, from the fall of the old feather to the bursting of the new sheath; 2, partially emergent from sheath; 3, still somewhat short; - (dash), completed new feather; . (dot), old feather; x, unobserved; ?, undecipherable; abs, absent; prs, present.

All enumerations, including the halves of the tail, are made starting from the outside. The main table (pp. 224-225), for economy of space contains only the eighty birds whose molt was incomplete. The remainder, whose molt was complete, and which were therefore only observed for color, are assembled in more condensed form in the smaller table which is presented here:

Character	No. Birds Observed	Present	Absent
"Mustard" above	68	66	2
Yellow below	68	67	1
Belly streaks	51	38	13
Buffy chest, etc.	53	39	14

The most important generalization to be drawn from these tables is that all the variable characters are regular or usual characteristics of *all* fresh plumages, and are in no way indicative of the bird's age. The orange wing-bars are regular, and regularly fade out to white, while the yellow underparts, buffy chest, and belly streaks are usual, and may fade out entirely or be persistent in varying degrees, doubtless according to their original strength. Belly streaks probably do not disappear by fading. The only other logical possibility would be that the pallid coloring was the result of the pre-nuptial, and the strong coloring of the post-nuptial, molt, which is so unlikely as to be negligible. The fact that in every molting specimen but two the molt was participated in by the remiges, and the fact that the two exceptions were cases of practically completed molt, with only a few middle coverts still short, militates against the probability of a partial autumn molt by the young of the season. A single interesting case occurred, in which an unquestionably new plumage, with orange wing-bars, was otherwise pallid throughout. It is regrettable that this was not realized before the bird was released and further notes made of the general condition. In no instance was a new wing-covert found to be white-tipped.

Since our knowledge of the molt in general is so incomplete, it would perhaps be a pity to close without a resumé of the other facts which these tables offer us,

Date		Number	Right or left	Primaries	Proximal Middle Distal tertials	Greater coverts	Tail	Middle coverts	Secondaries	Mustard above	Yellow below	Belly streaks	Buffy chest, etc.
				123456789		1234567891011	123456	12345678	123456				
Aug.	28	1	R	12	...	.....	.....	.....	.....	abs	abs	x	x
			L	1	...	.....	.....	.....	.....				
Aug.	29	2	R	.....	.1.	.....	.....	.....	.....	abs	prs	abs	x
			L	.....	.1.	.....	.....	.....	.....				
Aug.	27	3	R	133	.1.	....111..	.....	.....	.....	abs	abs	x	x
			L	133	.1.	....111..	.....	.....	.....				
Aug.	31	4	R	.....13_	31.	111111111	...111	.....	.....	abs	abs	abs	prs
			L	.....13_	31.	.11111112 1	...111	.....	.....				
Aug.	28	5	R	133	.2.	.....	.....	.....	.....	abs	abs	abs	x
			L	.....1__	.2.	.....	.....	.....	.....				
Aug.	29	6	R	.....1__	.2.	.....	....1.	.....	.....	abs	abs	abs	prs
			L	.....1__	.2.	.....	...11.	.....	.....				
Sep.	2	7	R	.....2__	.3.	.....	.....	1	.....	abs	abs	abs	abs
			L	.....2__	.3.	.....	.....	.....	.....				
Aug.	31	8	R	.....3__	...	.....	.....	.....	.....	abs	abs	abs	prs
			L	.....3__	...	.....	.....	.....	.....				
Aug.	28	9	R	.....3__	...	.....	.....	.....	.....	abs	abs	abs	x
			L	.....13__	...	.....	.....	.....	.....				
Aug.	28	10	R	.....3___	.2.	1222222___	.....	.....	.....	abs	abs	x	x
			L	.....23__	.2.	2222222___	.....	.....	.....				
Sep.	2	11	R	....133__	.2.	222222221 2 2	111111	.....	.....	abs	abs	prs	abs
			L	....133__	12.	222222221 2 2	...111	.....	.....				
Aug.	27	12	R	....133__	2..	---------- 1	112221	...1....	.....	abs	abs	x	x
			L	....133__	1_1	---------- 1	112221	.....	.....				
Aug.	28	13	R	....13___	...	111111___ - -	...111	.....	.....	abs	abs	abs	x
			L	....13___	1__	11111___ - -	...111	.....	.....				
Aug.	27	14	R	....3____	...	-------22. . .	.....	.....	.....	abs	abs	x	x
			L	....3____	...	-------21. . .	.....	.....	.....				
Aug.	28	15	R	...131___	__1	----------	.11222	.....	.....	abs	prs	x	x
			L	...133___	__1	----------	.11222	.....	.....				
Aug.	29	16	R	...13____	___	----------	..1111	.....	.....	abs	abs	abs	x
			L	...13____	___	----------	..1111	.....	.....				
Aug.	29	17	R	...13____	___	----------	...333	.....	.....	prs	abs	abs	prs
			L	...13____	___	----------	111333	.....	.....				
Aug.	29	18	R	...13____	__2	_1122_____ ?	.123_3	11111...	.....	abs	abs	abs	x
			L	...13____	__2	1--------- - -	.123_3	...11...	1.....				
Sep.	7	19	R	...13____	__3	----------	?	.....	1.....	abs	abs	abs	prs
			L	...13____	?	----------	?	.....	.....				
Sep.	2	20	R	...13____	___	----------	...222	.....	1.....	abs	abs	abs	prs
			L	...13____	__2	----------	...222	.....?	.....				
Sep.	2	21	R	...12____	___	----------	?	..11111.	2.....	abs	abs	abs	prs
			L	...13____	__1	----------	?	.1112...	2.....				
Aug.	27	22	R	...22____	__3	---------- 2	23____	11211_11	1.....	abs	abs	x	x
			L	...22____	__3	---------- 2	23____	11111111	1.....				
Aug.	27	23	R	...33____	.1.	111111___ - -	?	.....	.....	abs	x	x	x
			L	....23___	1..	..1------- - -	?	11.....	.....				
Sep.	2	24	R	...2_____	__3	----------	111111	111111_1	3.....	prs	abs	abs	prs
			L	...2_____	__3	---------- 2	111111	11111111	3.....				
Aug.	31	25	R	...2_____	__1	----------	.1____	.....	.....	prs	abs	abs	prs
			L	...2_____	__1	----------	.1____	..1111..	1.....				
Aug.	30	26	R	...2_____	___	----------	11____	_1111..?	2.....	abs	abs	abs	prs
			L	...2_____	___	----------	11____	11111.1.	21....				
Aug.	29	27	R	...3_____	___	----------	.23___	.....	3.....	prs	abs	abs	abs
			L	...3_____	___	----------	.23___	.....	3.....				
Aug.	31	28	R	...3_____	__2	----------	23____	12221...	3.....	prs	abs	abs	prs
			L	...3_____	__2	----------	23____	2222.111	3.....				
Sep.	5	29	R	...3_____	___	----------	..2222	..2222..	3.....	prs	abs	abs	prs
			L	...3_____	___	---------- 2	112222	.....	3.....				
Sep.	2	30	R	..13_____	___	----------	2_____	.2.1111.	3.....	prs	prs	abs	prs
			L	..13_____	___	----------	2_____	1111..11	3.....				
Aug.	30	31	R	..12_____	___	----------	____32	1111.11.	_1.....	prs	abs	abs	prs
			L	..12_____	___	----------	____	.1_11.11	_1.....				
Sep.	5	32	R	..13_____	__2	----------	12233_	...7....	37....	abs	prs	abs	abs
			L	..13_____	__2	----------	12233_	.....	37....				
Aug.	29	33	R	..13_____	__2	----------	133333	1111111.	2.....	abs	abs	abs	x
			L	..13_____	__1	----------	133333	111111..	2.....				
Sep.	1	34	R	..13_____	__3	----------	13____	12221112	2.....	prs	abs	abs	prs
			L	..13_____	___	----------	13____	12221112	2.....				
Aug.	29	35	R	..13_____	__3	----------	22____	22222221	_3....	abs	abs	abs	x
			L	..13_____	__3	----------	2_____	22222221	32....				
Aug.	31	36	R	..13_____	___	----------	13____	-------1	31....	prs	abs	abs	prs
			L	..13_____	__3	----------	13____	-------11	31....				
Sep.	2	37	R	..13_____	__3	----------	13____	1_____1	31....	prs	abs	abs	prs
			L	..13_____	___	----------	13____	11_____13	31....				
Sep.	1	38	R	..13_____	__2	----------	1_____	2_____2	3.....	abs	abs	abs	prs
			L	..13_____	__3	----------	3_____	2_____2	31....				
Aug.	27	39	R	..13_____	___	----------	23____	_____222	31....	abs	abs	x	x
			L	..13_____	___	----------	23____	_____222	31....				
Sep.	1	40	R	..13_____	___	----------	123___	2_____	_2....	abs	abs	abs	prs
			L	..13_____	___	----------	123___	22_____	31....				

Date	Number	Right or left	Primaries	Proximal Middle Distal tertials	Greater coverts	Tail	Middle coverts	Secondaries	Mustard above	Yellow below	Belly streaks	Buffy chest, etc.
			123456789		1234567891011	123456	12345678	123456				
Sep. 2	41	R	..13_____	___	_____ _ _	3_____	1222....	31....	prs	abs	abs	prs
		L	..13_____	___	_____ _ _	3_____	.1111.11	31....				
Sep. 2	42	R	..13_____	___	_____ _ _	_____	111__111	3.....	prs	abs	abs	prs
		L	..13_____	___	_____ _ _	_____	.11_1_.1	3.....				
Aug. 30	43	R	..23_____	___	_____ _ _	3_____	____2111	_1....	prs	abs	abs	prs
		L	..23_____	___	_____ _ _	3_____	__221111	32....				
Sep. 2	44	R	..23_____	___	_____ _ _	3_____	_____2_1	3.....	prs	abs	abs	prs
		L	..23_____	___	_____ _ _	3_____	_____2_2	3.....				
Sep. 3	45	R	..1_____	___	_____ _ 1	_____	1111.11.	_1....	prs	abs	abs	prs
		L	..1_____	___	_____ _ 1	_____	.1___1_	_1....				
Aug. 27	46	R	..2_____	___	_____ _ _	23____	.....	_3....	prs	prs	x	x
		L	..2_____	___	_____ _ _	23____	.....	_3....				
Aug. 30	47	R	..2_____	__3	_____ _ 2	33____	_____2	_31...	prs	abs	abs	prs
		L	..2_____	__3	_____ _ 2	33____	_____2	_31...				
Aug. 27	48	R	..2_____	___	_____ _ _	_____	___11__1	2.....	abs	abs	x	x
		L	..2_____	___	_____ _ _	3_____	1____1_1	2.....				
Aug. 28	49	R	..3_____	___	_____ _ _	_____	_____	_____	prs	abs	abs	x
		L	..3_____	___	_____ _ _	_____	_____	_____				
Aug. 27	50	R	..2_____	___	_____ _ _	3_____	_____	_2....	prs	abs	x	x
		L	.2_____	___	_____ _ _	3_____	2____22	2.....				
Sep. 1	51	R	.13_____	___	_____ _ _	3_____	.____1.	_3....	abs	prs	abs	prs
		L	..3_____	___	_____ _ _	3_____	1_____.	_1....				
Aug. 31	52	R	.13_____	__3	_____ _ _	3_____	_____	_21...	prs	abs	prs	prs
		L	.13_____	__3	_____ _ 2	3_____	_____2	_31...				
Sep. 1	53	R	.13_____	222	_____ _ _	3_____	22____2	73....	prs	abs	abs	prs
		L	.13_____	___	_____ _ _	3_____	222__22	73....				
Aug. 29	54	R	.13_____	__3	_____ _ _	3_____	.____1__	_3....	prs	abs	abs	x
		L	.13_____	___	_____ _ _	3_____	_____	_3....				
Sep. 7	55	R	.13_____	___	_____ _ 3	33____	_____	32....	prs	prs	abs	abs
		L	.13_____	___	_____ _ _	33____	11111111	32....				
Aug. 27	56	R	.13_____	___	_____ _ _	23____	22__22_	_21...	abs	abs	x	x
		L	.13_____	___	_____ _ _	23____	____3222	_21...				
Aug. 30	57	R	.13_____	___	_____ _ _	3_____	_____1_	_31...	prs	abs	prs	prs
		L	.13_____	___	_____ _ _	3_____	___1_11	_31...				
Aug. 27	58	R	.13_____	___	_____ _ _	3_____	_____1	_31...	abs	abs	x	x
		L	.13_____	___	_____ _ _	3_____	____1_1	_31...				
Sep. 5	59	R	.13_____	___	_____ 1 _	_____	1_____.	_3....	prs	abs	abs	prs
		L	.13_____	___	_____ _ _	_____	_____	_3....				
Aug. 28	60	R	.13_____	__2	_____ _ _	3_____	_____	_31...	prs	abs	x	x
		L	.13_____	___	_____ _ _	3_____	_____	_31...				
Aug. 31	61	R	.1_____	___	_____ _ 2	3_____	111	31....	prs	prs	prs	abs
		L	.1_____	___	_____ _ _	_____	1____111	31....				
Aug. 29	62	R	.1_____	___	_____ _ _	_____	_____	_2....	prs	prs	abs	x
		L	.1_____	___	_____ _ _	_____	_____	_2....				
Aug. 27	63	R	.3_____	___	_____ _ _	_____	_____	_32...	prs	abs	x	x
		L	.33_____	___	_____ _ _	_____	_____	_32...				
Aug. 31	64	R	.3_____	___	_____ _ _	_____	_____	_31...	prs	prs	abs	prs
		L	.3_____	___	_____ _ 2	_____	_____	_31...				
Sep. 2	65	R	123_____	__3	_____ _ 2	3_____	_____	_1....	abs	abs	abs	prs
		L	113_____	__3	_____ _ _	3_____	____2__	_1....				
Sep. 2	66	R	133_____	___	_____ _ _	3_____	2____22	_31...	prs	abs	abs	prs
		L	123_____	___	_____ _ _	_____	1_____2	3121..				
Sep. 2	67	R	123_____	___	_____ _ _	_____	_____111	_32...	prs	abs	abs	prs
		L	123_____	___	_____ _ _	_____	_____11	_32...				
Aug. 28	68	R	123_____	___	_____ _ _	_____	_____	_321..	prs	abs	abs	x
		L	123_____	___	_____ _ _	_____	_____	_321..				
Sep. 2	69	R	137_____	___	_____ _ _	_____	_____	_32...	prs	prs	abs	prs
		L	133_____	___	_____ _ _	_____	____2__	_32...				
Sep. 7	70	R	133_____	___	_____ _ _	3_____	_____	__31__	prs	abs	abs	prs
		L	133_____	___	_____ _ _	3_____	_____	__31..				
Sep. 7	71	R	133_____	___	_____ _ _	3_____	_____	__31..	prs	abs	abs	prs
		L	133_____	___	_____ _ _	3_____	_____	__31..				
Sep. 1	72	R	13_____	___	_____ _ _	_____	_____	__337.	prs	abs	abs	prs
		L	333_____	___	_____ _ _	_____	_____	__321.				
Sep. 7	73	R	13_____	___	_____1 _ 1	_____	1___1.17	__3...	prs	abs	prs	prs
		L	13_____	___	_____ _ 3	_____	1___222.	__3...				
Sep. 2	74	R	13_____	__3	_____ _ _	3_____	_____	_11...	prs	abs	abs	prs
		L	13_____	__3	_____ _ _	3_____	_____	_11...				
Sep. 7	75	R	13_____	___	_____ _ _	_____	_____	_32...	prs	abs	abs	prs
		L	13_____	___	_____ _ _	_____	_____	_32...				
Aug. 28	76	R	13_____	___	_____ _ _	_____	_____	__31..	abs	abs	x	x
		L	13_____	___	_____ _ _	_____	_____	__31..				
Sep. 7	77	R	33_____	___	_____ _ _	_____	_____	__31..	prs	abs	abs	prs
		L	33_____	___	_____ _ _	_____	_____	__31..				
Aug. 27	78	R	2_____	___	_____ _ _	_____	_____	21....	prs	abs	x	x
		L	2_____	___	_____ _ _	_____	_____	21....				
Aug. 28	79	R	_____	___	_____ _ _	_____	__111111	_____	prs	abs	prs	x
		L	_____	___	_____ _ _	_____	__11_111	_____				
Sep. 2	80	R	_____	___	_____ _ _	_____	___1__1__	_____	prs	abs	abs	prs
		L	_____	___	_____ _ _	_____	_____1__	_____				

though they are perhaps neither novel nor striking. First, therefore, to review the sequences of molt within particular tracts:

1. Primaries, as usual *falling from the inside outward*, without exception and with the most perfect bilateral synchronism, that is, equality of the two sides at all stages. In all eighty cases no corresponding pair varies significantly in growth.

2. Secondaries, equally regular in sequence from the outside, and with the same perfect synchronism of sides.

3. Tertials, invariably in sequence of middle, upper, lower (or middle, proximal, distal), with a curiously regular delay after the fall of the middle feather. In nos. 5, 6, 7, 10, 11, and 14, for instance, the middle feather has completely or nearly renewed itself before either of the others has fallen. The bilateral time-correspondence is scarcely less perfect here.

4. Tail: The three inner pairs fall and are replaced simultaneously, often accompanied by the next pair, which, however, shows a decided tendency to follow in a sequence which is regular in the case of the ensuing outer pairs. Elaborate measurements of great numbers of molting skins might reveal some further evidence of sequence among the central rectrices, but we got no hint of it. The only suggestions of the sort (nos. 18 and 32) are contradictory. No. 24 shows a case of the whole tail falling simultaneously. The bilateral synchronism is perfect.

5. Greater coverts: A tantalizing tract, continually suggesting some order, but never giving us the right to describe it. It furnishes one point of contrast with the middle coverts, in that the molt seems always to start *from a given point or center*. In no case do we find the condition common in the middle coverts, of commencement and progress from two points at once. To be sure, the whole tract may fall at once, or nearly at once, as in nos. 4 and 11. Yet one cannot but feel that the contrast between the two tracts is a real and permanent one, though it may be giving too free a rein to fancy to suggest without more evidence that the greater coverts are in a state of transition, passing towards or away from a condition of greater regularity, or recalling, perhaps, an ancestral condition of simultaneous molt. One of the most startling facts in these tables is the speed with which the greater coverts are replaced, as may be noticed between numbers 9 and 15. The whole process evidently takes place, in the great majority of cases, while the primaries are molting from one to two feathers. This is in notably sharp contrast with the middle coverts, although the latter are still more prone to simultaneous molt. Molt commencing in the middle is far more rare than from either end. Indeed, in the two cases where the movement seems to have begun centrally, the briefest period might have sufficed to change the appearance of the situation by the fall of the remaining outer feathers on one side. It is probable that our few early cases give a somewhat unjustly irregular impression, in the light of the fact that such a large number of more advanced individuals are terminating the molt of this tract at the proximal end. The correspondence of the sides is evident, though subject to variation.

6. Middle coverts: All traces of order disappear. Thus the molt of these tracts would seem to conform to the law that regularity of molt exists in direct ratio to the active utility in flight of the pteryla in question, and that molt by single feathers, the two sides moving *pari passu*, is restricted to indispensable tracts.

Granting the dependability of the primaries as time-indicators, the sequence of the ensuing tracts seems to be fairly regular, in the order represented horizontally in the larger table, but is not without definite exception. Thus such scattered inconsequentialities as those shown among the middle coverts of nos. 7 and 12 are

likely to be the results of accidental losses; but no. 4 shows unquestionable early molting in both greater coverts and tail, while nos. 27, 32 and 46 show even more striking cases of delay on the part of the middle coverts. In sharp contrast to the fairly definite order of commencement of the minor tracts is their scattered irregularity in terminating their molts. The middle coverts, most irresponsible and insubordinate of pterylae, even straggle, in one or two cases, beyond the completion of the secondaries, which, very regular but very late and slow, mark the usual and ordinary closing of this, at least external, renewal of youth.

Indianpoint Lake, Barkerville, B. C., Canada, December 20, 1927

LIFE HISTORY OF THE RED-BELLIED HAWK

WITH FIVE ILLUSTRATIONS

By JAMES B. DIXON

THE RED-BELLIED HAWK *(Buteo lineatus elegans)* is a fairly common bird in San Diego County, California, and while this narrative has to do with a particular pair of these birds which had their home just across the line in Riverside County, the data in general were gathered in Los Angeles, Riverside, Orange and San Diego counties during the years from 1898 to 1927, inclusive.

For years I had hoped to find a nest that would lend itself to photography and to easy observation, and finally one was located on April 25, 1927. This nest was in a large willow in a thick grove of trees in the Temecula River bottom of Riverside County. The location of the nest tree is almost exactly 1000 feet above sea

Fig. 72. GENERAL VIEW OF NESTING GROUNDS OF RED-BELLIED HAWK ALONG TEMECULA RIVER, RIVERSIDE COUNTY, CALIFORNIA. NESTING GROVE IN FAR CENTER OF PICTURE.

level, and it is less than 150 feet from the road known as the inland paved highway. The nest was an old one and had been used the year previously by a pair of Long-eared Owls which had successfully raised a family therein. In the early part of February, 1927, a pair of Red-bellied Hawks was seen and heard in this immediate vicinity, being noticed sitting upon a nearby telephone pole.

Upon reaching the road alongside the nest we could see the head of the brooding bird. Upon climbing the tree, three heavily marked, badly incubated eggs were found to be in the nest. The brooding bird left when the climber was about two-thirds of the way up the tree, and without any noise sailed away across the tree tops. As we were leaving, she was heard squalling among the trees a short dis-

tance upstream. At the time of this visit there was no food of any kind in or around the nest, as we took pains to ascertain.

The next trip was made on May 1. Nothing was seen of the birds when we arrived, and as some Mexicans were loading wood into a wagon directly under the tree, we supposed that the old birds had left the vicinity for the time being. However, when we were nearly up to the nest one of the old birds flushed therefrom and sailed silently away over the tree tops. We did not see them again that day, but a little later heard them both calling a little way upstream. The old

Fig. 73. TYPICAL NEST AND SET OF EGGS OF RED-BELLIED HAWK.

birds when disturbed, always flew away in the some direction, upstream.

At this time the nest contained one infertile egg and two young, which we judged to be five days out of the shell, appearing as shown in figure 74. The nest was not changed in appearance since our previous visit except that some green leaves had been recently renewed. On the edge of the nest lay the hind quarters of a young cottontail rabbit and there was considerable fur scattered about. The young birds did not seem at all alarmed and did not even show any signs of fright when taken in our hands. Their home was neat and clean and the young birds, even at this age, were careful to discharge all excrement clear of the nest. As it

was a cloudy, cold day and the young birds gave some indications of chilling, we cut our call short after obtaining several photos.

On May 14 we made another visit, and upon driving the car under the tree, one of the old birds flew out, disappearing in the same general direction as before. Shortly after, she was heard calling. The young birds were found to have made a wonderful growth in the two weeks since our last visit, but they were disappointing in their actions. They seemed very much afraid and sought to hide themselves, thrusting their heads under the fresh willow sprigs, which were still kept as carefully renewed as before the eggs were hatched. The young birds did not offer any resistance when taken in the hands. The infertile egg was still

Fig. 74. VERY YOUNG RED-BELLIED HAWKS, PHOTOGRAPHED MAY 1, 1927.

there and the nest platform was commencing to show the results of use. The only evidence of food at this time was the uneaten remnants of several wood rats. A careful search was made at this time and at all other visits to the nest, for bird feathers or remains, but none was ever found. As the day was a warm one and the birds were past the period of being hurt by being chilled, we spent considerable time watching them and waiting to see if either of the old birds would bring them food while we were near; but the young birds would only try to hide themselves and the old birds did not make their appearance during the two hours of our stay.

On June 5, upon driving under the nest, we noticed that something was wrong with the tree, and found that the large limb from which we had been operating our camera had been torn off and was lying on the ground. Wondering how now to proceed, we commenced to climb the tree, but the young hawks were not to have their pictures taken again in the old nest. As soon as we climbed high enough to be seen by the birds, they both, without a moment's hesitation, took flight, in opposite directions, to nearby willow trees. After quite an exciting time we managed to secure both of them. They were no longer the heavy featherless squabs that we had seen on our last visit, but were now two fighting wild creatures which would lie on their backs and present a formidable array of sharp claws for one's reception.

The nest had been beaten flat and all of the new work that had been done at the time the eggs were deposited had been worn away; the infertile egg had disappeared, presumably having been rolled overboard by the young birds. The only sign of food at the nest was a full grown mole which lay on the nest edge, untouched by the young birds. The youngsters appeared well fed and in fine condition. After considerable trouble several exposures were made of them sitting upon an overturned willow tree, after which we banded each of them and returned them to the lower branches of the nest tree. They speedily climbed some twenty-five feet upward and found for themselves suitable perches. While we were watching them, one of the old birds flew over our heads and onto the nest, apparently not knowing that we were there or that anything unusual had taken place. When the old bird began calling, the youngsters only turned their heads sidewise and looked up toward the nest, but they did not answer or make any attempt to climb nearer. At the very first movement we made, the old bird left the vicinity and we did not see or hear either of the old ones again on this visit.

On June 12, 1927, we returned in search of a California Cuckoo's nest, and while going through thick willow thickets about one-half mile down stream from the hawk's nest we found a young hawk roosting there. After considerable climbing and bending of limbs we secured a young Red-bellied Hawk, which proved to be number 100529. The bird seemed well, and was full of fight after being captured. We could not see anything wrong with it; and apparently there was not, for when we turned it loose it climbed up into a larger willow tree and took flight. The last we saw it was some distance upstream flying as though it had been doing so for years.

We were unable to locate number 100530, but I have no doubt it also was hidden away from the crows and ravens in some nearby thicket. The captured bird's beak and feet were bloody, and in a nearby willow stub on top of a flat limb we found part of a full-grown wood rat which the old birds had apparently furnished.

Of all the raptores living in this section, the range of the Red-bellied Hawk is the most restricted. This is caused apparently by its food habits, since by far the larger part of its prey consists of small mammals which are found abundantly where moisture is plentiful and where green food for rodents is growing nearly the year around. I have never seen or heard of a pair of these birds residing in a section where there was not permanent running water and where beds of water cress and green grasses were not abundant. This sort of surroundings creates a large supply of meadow mice, rats, gophers and rabbits, upon which the hawks prey.

The range of this hawk, as regards elevation above sea level, is sharply defined.

I have never found a pair resident and breeding above 1200 feet, although running streams and green meadows are more prevalent at higher elevations. It is essentially a bird of the lower wooded river bottoms, between sea level and 1200 feet; and, unlike the Cooper Hawk, Swainson Hawk and Western Red-tail, the Red-bellied Hawk does not adapt itself to different surroundings. If a pair becomes established in a certain range it is not easily driven out, and often bloody tussles occur with the larger Western Red-tail. I have never known of an instance where the smaller gave way to the larger bird, even though the Red-tail might preëmpt the

Fig. 75. YOUNG RED-BELLIED HAWKS, PHOTOGRAPHED MAY 15, 1927, WHEN TWENTY DAYS OLD.

nest of the Red-bellied Hawk and force construction of another.

The typical range of a pair of these birds usually contains a central grove of oak, willow, or cottonwood trees in a river bottom, in which to build the nest. The birds are particularly partial to such a location when the surrounding canyon sides are heavily wooded and the stream bed is surrounded by open meadows of wet pasture land and alfalfa fields. They have a habit of sitting low on some dead snag or telephone post from which they can dart suddenly down and capture their prey. Their sense of hearing is extremely keen and I think they hunt as much by it as by sight. They do not descend from a great height in a grand swoop to strike

their unsuspecting prey as does the Western Red-tail or the Golden Eagle, their hunting tactics being much more like those of the Marsh Hawk and the American Long-eared Owl.

The Red-bellied Hawk, like the Cooper Hawk, selects as a nest site, not some commanding view of its hunting grounds, but a location in a densely wooded grove. Preferably, the nest is placed about one-half way up the main stem of the tree (see fig. 75), upon horizontal limbs and braced against the main trunk. This is a distinctive trait where nesting groves have not been disturbed by clearing of land or been washed away by floods. Rather than leave a chosen hunting ground, however, the hawks will accommodate themselves to almost any kind of a location. Considering their size, the birds build the smallest structure of any of the raptores hereabouts. I have often found nests which from the ground looked as

Fig. 76. YOUNG RED-BELLIED HAWKS WHEN FORTY-ONE DAYS OLD.

though they could not possibly contain eggs, let alone conceal a sitting bird, but upon climbing the tree, the bird would leave and the nest would be found to contain four eggs. After incubation is well begun it is almost impossible to flush the sitting bird by any other method than climbing to the nest, and in several instances I have known the bird to remain until the climber reached it.

The nest is composed outwardly of dead twigs of the trees common to the river bottom, such as sycamore, willow and cottonwood, the inner part of frayed-out bark of the cottonwood and willow. This bark makes a soft mat upon which the finishing touches of green leaves and downy feathers are placed. The green

leaves are constantly replenished during the incubation period and long after the young are hatched. After incubation has progressed somewhat a large number of downy feathers will make their appearance on and around the nest. This becomes so noticeable in some cases as to be a sure sign of occupancy and one which I have never noticed to such a marked degree in any of our other raptores.

A pair of hawks often has two or more nests, usually in the same tree or in adjoining trees, and if undisturbed they will remain year after year in the same grove. If an old nest is used, very little is done to it with the exception of relining with bark and green leaves; so the structure does not take on such a large size as with other hawks. The determining factor in a location seems to be the food supply, and if that is to be had the hawks will use whatever trees are available. I have found nests in willow as low as twenty-five feet from the ground and in large sycamores as high as eighty-five feet. I have never found these hawks using any nest but one constructed by themselves, though I have found other birds using theirs.

If it were not for the Red-bellied Hawk being so noisy during the mating season, it would be very little noticed; but, because of this habit, it is easily found at that time of year. While it is not often seen, it is often heard, especially during the last of February and the first few weeks in March. The call consists of seven or eight sharp, shrill, whistling sounds starting with a lower and subdued note and gradually ascending to the middle of the call and then descending again both in pitch and in volume. As nearly as I can express it in words it would appear as *keee-ah, keee-ah,* KEEE-AH, KEEE-AH, *keee-ah, keee—a-h, keee-a-a-hh.* This squalling is usually indulged in while the bird is circling high in air, usually a mere speck against the sky, but it is also often heard in a more subdued and shorter form shortly after a brooding bird has been flushed from the nest.

At this time of the year the birds do their hunting early in the mornings and late in the evenings; from about nine o'clock in the morning until mid-afternoon they are busy nest building, loafing and indulging in queer aerial antics. As I have never been able to tell the male from the female bird by observation I could not say whether one or both perform in the air, but presume that it is the male bird; only one is seen at a time doing stunts. The usual program is for the bird leisurely to ascend in wide spirals to an elevation of 1500 to 2000 feet above the nest grove, where it will give a few preliminary flaps of its wings, the signal for the noise to begin, and squalling and diving it will descend to the same place from which it started or to the nest grove nearby, in a series of nose dives and side slips. I have seen eagles doing this same stunt without the noise, but have also noted that always in the offing there is an interloper in the form of another eagle, to whom it is perhaps given as a warning. The Red-bellied Hawk seems to do this stunt for the sheer joy of the thing. The birds are not conspicuous in other ways during the breeding season and do not sit around close to the nest as does the Western Redtail.

The time of the laying of the eggs varies considerably with the years. If rains come early in the fall of the year previous, the eggs are deposited earlier. Normally they are laid between March 21 and April 10. From one to four eggs are laid and often the laying of a set of eggs takes as much as a week. The more heavily marked eggs are almost always deposited first. The eggs vary greatly in markings, even in the same set of eggs, and are the handsomest of all our raptores. The number of eggs in the clutch varies with different seasons. In October, 1925, this section of California was visited with unusually heavy rainfall. In the spring of 1926, I visited five different pairs of the Red-bellied Hawk, trying to find a nest which

would lend itself to successful photography and observation and every one of these nests contained four eggs. During the spring of 1927, the same territory was visited and apparently the same five pairs of birds were located, and every nest contained three eggs. Previous to this I had noted that during certain years sets of four eggs were common, and I had always correlated this with seasons of heavy rainfall. Search back over the rainfall records, however, revealed the fact that the laying of large sets of eggs and the raising of large families took place in years following early fall rains. Early rainfall is conducive to a much longer growing season for the native grasses, the natural food supply of small rodents. I am firmly convinced that the number of pairs of hawks in a territory suitable for their support, as well as the size of the families they may elect to raise, is governed entirely by the food supply, and this, in turn, is dependent upon rainfall and the proper distribution of the same over a long growing season.

The smallest egg in a series of eighteen sets, consisting of thirteen of four eggs each and five of three eggs each, measures 1.91 x 1.61 inches, and the largest 2.25 x 1.68 inches, indicating an average size of 2.08 x 1.64 inches.

After the eggs are laid and incubation begins, the two birds seem to share equally in this duty. The incubation period varies from twenty-three to twenty-five days, varying according to the care with which incubation was conducted in the first few days, during the laying of the eggs and directly afterwards. As incubation starts usually with the laying of the first egg, the young emerge from the shell over a period of several days. Quite a difference in size is often noted when they are first hatched, but this disappears as they reach the age of four or five weeks. In several instances where I have observed that the heavily marked eggs of a set were laid first, they were the first to hatch, and in all cases where infertile eggs were noted, these were the lightly marked or plain eggs of the sets. Infertile eggs are not at all uncommon and it is rarely that all of a set of four eggs are fertile. The young birds do not develop very fast the first week, but thereafter they increase rapidly in weight up to five weeks from hatching. Then the feathers begin to make their appearance and from this time on the feathers develop rapidly. (See figs. 74 to 76, which show the young at different ages.) I am firmly convinced that the Red-bellied Hawk does not prey upon birds, and that by far the larger part of its food supply consists of small mammals, mostly rodents such as are injurious to the growing agricultural crops of man.

In 1907, I personally visited and either collected a set of eggs from, or located, the nests of seven pairs of Red-bellied Hawks in the northern end of San Diego County, and in 1927, twenty years later, I made it a point to renew my acquaintance with these seven locations. In every instance I found a pair of hawks still resident in the same general locality. I have a record of twenty-three nesting locations within a radius of thirty miles of Escondido, and I think that this is all the hawks that the food supply will now warrant. Generally speaking, I do not think the food supply has undergone any radical change in the last twenty years.

Twenty years ago it was a common practice for everyone traveling through the country to carry along a shotgun, and any bird of prey was considered a good target. This condition does not exist at present, as the cost of ammunition has increased, the game laws are being enforced, and, last and most important, the people are becoming educated to the fact that our hawks and owls have their economic place in the well-being of the farmer, and they are seldom shot. Other changes are taking place which make the outlook in this section more cheerful for a continuing number of these beautiful birds to live here. A few years ago not far from where I live

there was a long strip of river bottom in which resided a single pair of Red-bellied Hawks. Today, this same stream has been dammed and where the river bottom used to be there is a lake, and along the shores of this lake, in the same area which used to support a single pair of birds, three pairs now live, and all of them seem to thrive and find plenty of food. This has proven conclusively to me that if food supply conditions are right, the existing birds will breed up to fill in this favored area or less favorably situated birds will move in to fill the gap.

The only enemies this hawk has to my knowledge are his larger cousin, the Western Red-tail, and the man with a gun. I have seen the larger hawk attack and try to kill the smaller one where their hunting grounds overlapped, but I have never seen such an attempt succeed, although I have seen the smaller bird badly hurt. To some hunters a hawk is still a chicken thief and to be shot at sight; and as this hawk hunts low and is prone to nest alongside of well traveled roads and near occupied buildings, and, as it has a habit of perching on fence posts and telephone poles along well traveled roads, it is often shot. Even so, I feel sure that the Red-bellied Hawk has not diminished in numbers in the northern end of San Diego County in the past twenty years and I do not feel alarmed for its continued well-being as long as basic food conditions do not change. However, as this southern section fills up with people there is a constant crowding out from the populated centers for more rich lands on which to grow vegetables, and there has been a marked tendency to clear and cultivate the rich river bottoms where the Red-bellied Hawk makes its home. As time goes on, this is sure to continue and it is hard to say how these birds will then adapt themselves. In the past they have been found only in certain restricted areas and have not adapted themselves to any other, and it would seem that, when the time comes that man will need their present feeding ground, upon which to grow his own food, these birds will disappear.

Escondido, San Diego County, California, June 30, 1927.

YELLOWSTONE'S WINTER BIRDS

WITH ONE ILLUSTRATION

By M. P. SKINNER

American Merganser *(Mergus americanus)*. Resident.
Mallard *(Anas platyrhynchos)*. Resident.
Green-winged Teal *(Nettion carolinense)*. Resident.
American Golden-eye *(Glaucionetta clangula americana)*. Winter visitor.
Barrow Golden-eye *(Clangula islandica)*. Resident.
Canada Goose *(Branta canadensis canadensis)*. Resident.
Whistling Swan *(Olor columbianus)*. Winter visitor.
Wilson Snipe *(Capella delicata)*. Resident.
Richardson Grouse *(Dendragapus obscurus richardsonii)*. Resident.
Gray Ruffed Grouse *(Bonasa umbellus umbelloides)*. Resident.
Western Goshawk *(Astur atricapillus striatulus)*. Visitor.
American Rough-legged Hawk *(Buteo lagopus sancti-johannis)*. Winter visitor.
Golden Eagle *(Aquila chrysaëtos)*. Resident.
Bald Eagle *(Haliaeëtus leucocephalus)*. Resident.
Hawk Owl *(Surnia ulula caparoch)*. Resident?
Rocky Mountain Pigmy Owl *(Glaucidium gnoma pinicola)*. Resident?
Belted Kingfisher *(Streptoceryle alcyon)*. Resident.
Rocky Mountain Hairy Woodpecker *(Dryobates villosus monticola.)* Resident.
Red-shafted Flicker *(Colaptes cafer collaris)*. Resident.
Black-billed Magpie *(Pica pica hudsonia)*. Winter visitor.
Black-headed Jay *(Cyanocitta stelleri annectens)*. Resident.
Rocky Mountain Jay *(Perisoreus canadensis capitalis)*. Resident.
Western Raven *(Corvus corax sinuatus)*. Resident.
Clark Nutcracker *(Nucifraga columbiana)*. Resident.
Thick-billed Red-winged Blackbird *(Agelaius phoeniceus fortis)*. Resident?
Brewer Blackbird *(Euphagus cyanocephalus)*. Resident?
Gray-crowned Rosy Finch *(Leucosticte tephrocotis tephrocotis)*. Winter visitor.
Hepburn Rosy Finch *(Leucosticte tephrocotis littoralis)*. Winter visitor.
Black Rosy Finch *(Leucosticte atrata)*. Winter visitor.
Common Redpoll *(Acanthis linaria linaria)*. Winter visitor.
English Sparrow *(Passer domesticus)*. Resident.
Snow Bunting *(Plectrophenax nivalis nivalis)*. Winter visitor.
Alaska Longspur *(Calcarius lapponicus alascensis)*. Winter visitor.
Western Tree Sparrow *(Spizella monticola ochracea)*. Winter visitor.
Mountain Song Sparrow *(Melospiza melodia montana)*. Resident.
Bohemian Waxwing *(Bombycilla garrula)*. Winter visitor.
Dipper *(Cinclus mexicanus unicolor)*. Resident.
Rocky Mountain Creeper *(Certhia familiaris montana)*. Resident.
Rocky Mountain Nuthatch *(Sitta carolinensis nelsoni)*. Resident.
Long-tailed Chickadee *(Penthestes atricapillus septentrionalis)*. Resident.
Mountain Chickadee *(Penthestes gambeli gambeli)*. Resident.
Townsend Solitaire *(Myadestes townsendi)*. Resident.

The Yellowstone is our largest National Park, having an area of 3348 square miles. By far the larger part of it occupies the extreme northwestern corner of Wyoming, but it also includes narrow strips in Idaho and Montana. Its altitude above sea-level varies from its lowest point (5300 feet), at the junction of the Yellowstone and Gardiner rivers on its northern boundary, to the summit of Electric Peak at 11,125 feet. Curiously, the lowest and the highest points are only six miles apart, and each is in sight from the other. The larger part of the area below 6500 feet

altitude is treeless, but from that point up to timber-line at about 9500 feet the area is chiefly forested, although there are occasional upland prairies and open parks in this forest, even on the highest elevations.

The treeless areas are partly covered with sage-brush and partly with a luxuriant growth of grasses. Wherever rivers and smaller streams flow through the lower lands, they are bordered by brush and deciduous trees, and frequently there are strips of coniferous trees as well. Even away from the streams there are groves of aspens and Douglas firs on the lower slopes below the edge of the denser forests. But the greater part of the Park (a trifle over 70 percent of the whole) is an elevated, rolling plateau varying from 7000 to 8500 feet above sea-level. From this plateau occasional peaks and mountain ranges rise to over 10,000 feet altitude, and there are additional mountain ranges along the northwest, north, east and southeast borders of the Park. This plateau is largely covered by forests of lodgepole pine, Engelmann spruce, alpine fir and white-barked pine. In places there are a few limber pines. The lodgepole pines are the predominant trees, comprising more than two-thirds of all the forests, and actually covering one-half of the Park's total area.

The forests are open under the trees, except for the fallen trees that are rather heavy in places. The forests are so free from underbrush that brush-haunting birds would be absent if it were not for the thickets of alder, birch and other shrubs that line the lower streams, and the many varieties of willow that grow along the streams at higher elevations. The lower treeless areas are in the Transition life zone, and the forested plateau is in the Canadian and Hudsonian zones. But in reality the distribution of the life zones has little or nothing to do with the range of the winter birds within the Park. Throughout all elevations the soil and general topography is quite diversified and suited to all types of land birds. And there are numerous small ponds, large lakes and occasional marshes for the water-loving birds.

It is generally assumed that winter conditions in the Yellowstone National Park are truly Arctic in severity. Perhaps this is true of the mountain tops and the area above timber-line (about 2½ per cent of the total area), but the remainder of the Park has a much milder climate. The cold weather of the winter is due not so much to extremely low temperatures, although temperatures as low as fifty-nine degrees below zero, Fahrenheit, have been recorded on the Park plateau, as it is to long periods of steady cold assisted by much cloudy, stormy weather. And yet winter snowstorms are seldom heavy ones. Although the yearly snowfall varies from a hundred inches to more than double that depth, the great bulk of it falls as light, daily storms. The long continued periods of weather of temperature below freezing, combined with these daily snows, result in a long, steady accumulation of snow until there is often as much as two feet at Mammoth near the northern boundary, and as much as six feet at the southern boundary where the snowfall is heaviest. The difference between the figures for yearly snowfall and those for accumulated depth, is due to the settling and compacting of the snow on the ground, and to a quite considerable evaporation of the snow even without melting.

The accumulated depths of the snow here given are "on the level." As a matter of fact, winds are active and more or less steady in winter, resulting in an important amount of drifting. In spite of the frequent light snows, there are many hours of comparatively warm sunlight, especially in protected nooks. I have been thus explicit because all these factors have a direct influence on winter bird-life. The snows themselves are actually helpful because they store up moisture needed for the summer growing of grasses, herbs, shrubs and trees. And many of the winter birds could not visit the Park if there were not a ready supply of seeds and buds and cones.

Furthermore, when the weather is cold at night, the birds need the protection of the trees that the moisture produces, especially against the winds. But the winds, themselves, help the moisture storage by piling the snow into heavy drifts that require a longer time to melt in summer.

Since the hot springs and the geysers are the most conspicuous features connected with the Park, we naturally wonder what effect they have on winter bird-life. While the hot-spring and geyser areas are small compared with the total area, they really influence the bird-life to a considerable extent. Two general kinds of influences are felt, direct and indirect. I have seen many birds, such as Wilson Snipe, raven, Townsend Solitaire and mallard, actually warming themselves in the warm air from the hot springs. On the other hand, a few birds are killed by falling into the hot water, and a few ducks are scalded by trying to alight on hot lakes. But this danger is really very small, because the hot springs and geysers are more or less hidden in winter by heavy masses of steam, particularly so in the coldest weather, and seldom do these steam masses fail to warn birds of danger. A suffocating, and sometimes poisonous, gas is given off by many steam vents and old spring openings. Sometimes these gases overcome birds, but usually the winter birds escape, because of the warning steam from warmer openings, and the snow and ice that fill the colder openings.

But the indirect effects of the hot springs and geysers are far more important. All the rivers that receive hot water, such as the Snake (below the hot springs), Firehole, Gibbon, Madison, Yellowstone (below the Grand Canyon) and Gardiner (below the mouth of Boiling River) rivers, remain open all winter, no matter how stormy the weather gets, or how low the temperature sinks. Although the temperatures of these rivers are raised enough to prevent freezing, they are still cold enough for trout to live in them. This ready and abundant, obtainable food induces kingfishers to remain far north of their usual range, and also provides sustenance for the mergansers and other fish-eating species. The open rivers are winter homes for the mallards, teal, golden-eyes, Canada Geese and Whistling Swans, that otherwise could not remain. Many of these birds consume minnows and small animal life living in the warmed water. In addition, they secure much small vegetable food that is induced to grow by the warm water. While the dippers are birds that remain in winter wherever rapids and waterfalls keep the streams open, the main dipper population of the Park is largely concentrated in winter along the streams that receive hot water. Many insects such as diptera and may-flies breed in the water flowing away from hot springs, and these insects and their larvae are important foods for all kinds of winter birds. Even many birds that ordinarily depend on young grass and herbage are furnished with acceptable food. There are many meadows in the Yellowstone that are underlaid by series of warm springs sufficiently active to warm the ground above them enough to melt off all the snow, and keep the grass and short herbage growing fresh and green all winter.

One of the most interesting features of winter life in the Park is the presence of several Wilson Snipe. These birds live along the streams and in the meadows kept open by the hot springs. Since these birds are always to be found and are always in good condition, they evidently find plenty to eat. Other snipe remain in the Park near springs warm enough to keep the ground unfrozen, but which are not usually classed as hot springs. This presence of Wilson Snipe is especially interesting because Yellowstone's winter weather has the effect of keeping other shore and water-birds away in the spring. The ice freezes so thick and stays so long in the large lakes that

these birds going north in spring can find no suitable open water or unfrozen mud bars and shores.

Although the temperature there is low, the Yellowstone River just below Yellowstone Lake stays open all winter because the current is comparatively swift. Here, there are usually from twenty to a hundred Whistling Swans. These beautiful birds make their appearance with the first cold weather in October, or early November, and remain throughout the winter. With them, on the same waters, there are large numbers of ducks and geese.

There is an interesting movement of the golden-eyes in Yellowstone Park. The common bird in winter, and breeding in summer, is the Barrow Golden-eye. The American Golden-eye has not yet been found breeding here, but makes its appearance in October and stays throughout the winter. When it first comes, it remains on Yellowstone Lake and Yellowstone River. But with the freezing of Yellowstone Lake about Christmas time, the flocks of *americana* scatter to the larger open streams, although seldom seen there at other times. Throughout the winter, they are common with the Barrow Golden-eyes on the Gardiner River.

The Richardson Grouse and the Gray Ruffed Grouse are resident throughout the year. In summer they spend most of their time on, or near, the ground but in winter they are in the branches of the coniferous trees, often remaining there for days at a time in the foliage of the same tree, or same grove of trees. At such times they feed on buds, needles, seeds from the cones and on the mistletoe *(Arceuthobium americanum)* that is often common on the lodgepole pines. Most of the grouse spend the winters fully as high in the mountains as their summer habitat. And there are some indications that a few of the Richardson Grouse are higher in winter than in summer. In this, they differ from most other resident birds, for the usual rule is to move up the mountains in the spring and down again in the autumn.

This rule is well exemplified by the dippers that live along the streams on the Park plateau in summer and move down to the open Gardiner River in winter. Still, there are other individual dippers that remain as high as there is any open water at all. A remarkable thing connected with dipper life is that the birds sing all winter long. They have a particularly pleasing and varied song usually delivered by a bird perching quietly on a stone projecting from three to ten inches above the water. Although the roar of the rapids may drown out some of the music, at other times there may be a ringing echo to augment it. The song season begins about November first, reaches its height in February, and lasts at least until April. These songs are heard in all kinds of wintry weather, even the very coldest, and often during the heights of raging snowstorms.

The great exception to the rule of a winter habitat lower than the breeding habitat is shown by the Black-billed Magpies. These birds are common in the Park during the winter, being found then even as high as 8000 feet; but in May they leave the Park and go down on the plains to breed below 5000 feet. (A few pairs, possibly four or five, remain in the Park and nest at the lowest levels.)

The nutcrackers are very early breeders in the Park, mating in February and nesting later in the month. Sometimes the eggs are laid before the end of February, and the young birds hatched well before the end of March. I have seen the mother birds on their nests in below-zero weather, during snow squalls and throughout bitterly cold winds. At such times they merely crouched down into their nests until only their bills appeared above the rim. And these nests were exposed, too, except for the limited protection given by nearby foliage. They were not placed in more protected hollows

and cavities, but were built of cedar twigs, straws and shredded cedar bark, and placed in crotches of cedars and limber pines. After the young were out of the nest, the nutcrackers scattered, some going lower than the breeding area and some higher than they had been living.

Ravens appear to remain at about the same levels throughout the year unless compelled to seek out new feeding grounds. Crows seldom winter in the Park, and are never found living higher than the lowest levels, even in summer. The other members of the jay-crow group, such as the Black-headed Jays and the Rocky Mountain Jays, follow the usual avian custom of living at comparatively high elevations in summer, and moving down to lower levels in winter. But both remain above the treeless areas. In the autumn, the Rocky Mountain Jays acquire the habit of following every person they see, and often become very tame. When I have been riding in October and November, I have had them follow me a half-mile or more by a series of short flights. While on snowshoe trips later in the year, I have had these jays follow me four or five times as far. This was without feeding them, whereas if I

Fig. 77. CLARK NUTCRACKERS IN YELLOWSTONE NATIONAL PARK IN WINTER. From The Yellowstone Nature Book.

had cared to throw them something to eat, at times they would have followed all day long. Unlike the eastern blue jays and the nutcrackers, Rocky Mountain Jays are comparatively silent in the winter forests.

Both the Golden and the Bald Eagles remain in the Park all winter. During that period the Bald Eagles eat carrion, while the Golden Eagles eat rabbits when they can, and carrion when they must. Neither species is very common. And it is almost as rare to see a hawk. Once in a long period a Western Goshawk appears. The Rough-legged Hawk is more common, coming down from the north with the first cold weather in late September or early October, and a few remaining throughout the winter.

The curious Hawk Owl is sometimes seen in the winter in forests, hunting habitually throughout the daylight hours. Although the Rocky Mountain Pigmy Owl is undoubtedly present during the summer months, I have detected it only in winter. While not very common, it is occasionally seen in winter perched on a low,

dead limb of a small tree, and apparently enjoying the genial warmth of the sun. These two owls are the only ones I have seen during the Yellowstone winter. Although the Western Horned Owl certainly comes very early in spring and stays late in the autumn, I have never seen it during the winter months.

The Rocky Mountain Hairy Woodpecker is the only woodpecker I have identified each winter. But occasionally, during very mild winters, a Red-shafted Flicker or two will remain within the Park at the lowest elevations, below 6000 feet. On the other hand, the Rocky Mountain Creeper, the Rocky Mountain Nuthatch, the Long-tailed Chickadee and the Mountain Chickadee do their best to cheer up the somber white forests of winter. I do not know whether the Red-breasted Nuthatch stays all winter, or not. I have seen individuals as late as November 18 and as early as February 5, but not between those dates.

The Northern Shrike is another bird that I am not sure belongs on the winter list. It does not summer in the Park, but appears in both autumn and spring, the latest of my records being December 15, and the earliest February 15.

The Snow Bunting is not a common bird at any time and is more apt to be seen in the colder parts of the autumn than during the wintertime. The Alaska Longspur has only been detected two or three times in the Park, and all of those occurrences were in late January and early February. Flocks of Common Redpolls and Western Tree Sparrows are occasionally seen feeding on the seeds from old alder and birch catkins, but they are unusual and never really common. In the same way, flocks of Bohemian Waxwings sometimes come and feed on the juniper berries. Sometimes they stay about for a week or two at a time, but are usually even more restless than that.

The only really typical winter visitors to the Park are large mixed flocks of Gray-crowned, Hepburn, and Black rosy finches. These birds often make their appearance in large, dense flocks flying with a low, humming, whistling sound of their wings. Of 20,000 rosy finches counted during eight winters, 31 percent were Gray-crowned, 57 percent were Hepburn, and 12 percent were Black rosy finches. These birds act more or less as storm barometers. Normally, they remain as high as they can find food, but whenever they come down to lower levels, a severe snowstorm is sure to follow. Then, when the storm is over, the rosy finches retire again to their usual haunts.

Mountain Song Sparrows often elect to spend the winter in the sheltering brush along the Gardiner River. This may be due to the innate hardiness of the birds, or to the nearness of this comparatively warm water; perhaps to both. Still, this is notable, because the upper limit of these sparrows in summer is about 6500 feet in the Yellowstone, and here they are wintering above 5500 feet above sea-level! There are a few birds like the blackbirds, normally migrants, but occasionally trying to spend the winter near the barns and stables still maintained at a few places. Sometimes they survive the winter, more often they do not.

Another surprising winter bird is the Townsend Solitaire. This bird looks very much like a mockingbird except that there is not so much white and black marking its gray uniform, and there is more gray on the solitaire's underparts. Like the mockingbird, the solitaire is a wonderful singer, voicing a fine and varied melody. It is sweet, strong and clear, and has a quality all its own, suggesting the freedom and vigor of the mountains. This song is all the more appreciated because it is often given in late November and again in early February, when most other birds are silent. Perhaps the solitaire sings also occasionally between these dates and thereby earns rank as a full-voiced winter songster!

Jamestown, New York, November 15, 1927.

THE STATUS OF THE CARDINAL IN CALIFORNIA

By ALDEN H. MILLER

SINCE THE YEAR 1880, reports of cardinals *(Richmondena cardinalis)* in California have from time to time appeared in ornithological literature. But until recently, the species has been considered merely accidental in occurrence within this state, by no means established. However, the increasing number of reports of the cardinal in later years forces the viewpoint that this bird must soon merit recognition as an established member of the state's avifauna. The addition of any species to an avian fauna is an event which may provide important opportunity to gain insight into the ecology and survival powers of that species, or if geographically variable, then, also, of its various races.

The known occurrences of cardinals in California may properly be reviewed at this point. Belding (Land Birds Pac. Dist., 1890, p. 175) reports the introduction near Galt, Sacramento County, of six cardinals from Missouri, and mentions their subsequent appearance in the nearby river bottoms during a period of several years. No permanent colony seems to have been established, however. Emerson (Ornith. and Ool., VII, 1882, p. 119) records the taking of a cardinal at Hayward, Alameda County, which was identified as *"Cardinalis igneus"* on the basis of the limited facial mask and the thick beak. The specimen was later reported to have been an escaped cage bird. Unfortunately, efforts to locate this specimen in order to check the description have failed.

Several sight records of cardinals have been made available to me for publication by Dr. Loye Miller. In 1883, cardinals were observed by his mother, Mrs. Cora H. Miller, at Riverside, California, and were later seen by her when in company of Dr. Miller. The birds were four miles distant from the then small town, and the region at that time was little more than unimproved desert. The brilliant red plumage and song of these birds were noted. In 1905, Dr. Miller observed two male cardinals at 5th Street and Grand Avenue, Los Angeles, on the grounds of the old State Normal School, where the pair remained for several days in a group of pepper trees. The red color of these birds was overcast with gray, pointing to the probability that they were recently escaped cage birds. In 1915, Grinnell (Distributional List of the Birds of California, 1915, p. 187) reviewed the occurrences of cardinals to date, and assigned the species to the state in the hypothetical list.

On March 17, 1923, the present writer located a pair of cardinals in the wild blackberry thickets in the river bottom east of El Monte, Los Angeles County. The male was in constant song, responded to whistled imitations, and appeared as though stationed in this locality; it was observed during a period of several hours. All efforts to locate a possible nest were futile, and the birds were left unmolested. On April 28 of the same year, the birds were again observed in the same brush thickets, and the male was finally shot. The female was not procured and could not be found on a subsequent visit, May 8. However, on this last day, not more than a quarter of a mile distant, another pair was found, the male singing repeatedly. On May 12, a pair was seen about two miles down-stream from the points of previous observation. In 1924, many of the thickets had been cleared away and the stream course altered. One male bird was seen during April in the locality where the birds were last noted the previous year. Cardinals were not seen in two visits to this neighborhood during April, 1925, but were again noted on April 17, 1926. No further opportunities to search this portion of the river bottom have been presented, and the status of the species there during the succeeding two years is not known.

Henderson's two reports (CONDOR, XXVII, 1925, p. 211, and XXVIII, 1926, p. 243) on the cardinals under his observation during the years 1924, 1925 and 1926 seemingly confirm the belief that the species is becoming established over a considerable area in the San Gabriel River bottom, since presumably his records refer to the willow thickets in the neighborhood of Whittier some distance from El Monte. More recently, Gander (CONDOR, XXIX, 1927, p. 245) has recorded a cardinal from Balboa Park, San Diego; but, as suggested by the author, evidence points to the bird's recent escape from captivity. The only record from northern California during late years is contributed by Mrs. G. Earle Kelly of Alameda, who informs me of the observation on January 28, 1928, of a singing male cardinal in the chaparral association in the Hillsborough district not far from Burlingame, San Mateo County. This individual was near human habitations.

The one available California skin, taken as above, now number 1091 in the collection of Dr. Loye Miller, has been checked as to identity. The nature of the facial mask, the color of the crest and back, and the measurements of wing and tail place the bird nearest the subspecies of the eastern United States. It certainly does not belong either to the *superba* or *ignea* type of cardinal. The edgings on the feathers of the back are olive gray in contrast with the gray of *canicauda,* and the black across the forehead is broad as in *cardinalis.* Wing and tail measurements place the bird nearest *floridana* as may be seen in the table of measurements taken from specimens in the museum of the California Academy of Sciences, San Francisco, and in the California Museum of Vertebrate Zoology. However, the coloration is that of *cardinalis,* and, all points considered, it seems best to call the specimen *Richmondena cardinalis cardinalis,* approaching *floridana.*

AVERAGE MEASUREMENTS IN MILLIMETERS OF CARDINALS

Subspecies	Number of Specimens	Wing	Tail
floridana	5	89.7	93.7
California specimen	1	89.4	93.3
cardinalis	9	93.9	101.5
canicauda	5	91.3	100.4
superba	3	98.7	113.2
ignea	6	90.4	101.2

At least part of the stock now becoming established in southern California, judging from field observations and this one specimen, is *cardinalis.* The birds that were apparently successful in maintaining themselves for a period of several years at Galt were of this same race. In the case of a species as little given to wandering and migration as the cardinal, that also seemingly requires the presence of several of its number before becoming successfully established, we may assume that our California representatives are the result of repeated or extensive liberations rather than the result of invasion by wild birds. The nearest naturally occurring subspecies of cardinal is *superba,* which has through long time become adjusted to the desert conditions of Arizona; it frequents the mesquite association there. Should this race be spreading to California, it would most readily find suitable conditions along the Colorado River and in the Imperial Valley; but it has not been recorded from these localities. Howell (Auk, XL, 1923, p. 591) has pointed out that the deserts of southeastern California seem to have formed an effective barrier against the spreading of cardinals. Whether *superba* would adjust itself to the coastal conditions of California is doubtful. It is more reasonable to find that the subspecies *cardinalis* is in a measure successful in the coastal environment, this territory perhaps affording conditions not radically different from those prevailing in certain parts of the normal ranges of *cardinalis* or *floridana.*

Unfortunately no records of birds brought into California from other parts of the United States, except at the ports of entry along the coast, are kept by the state or national government officials. The importation of birds from other countries, of course, is known. In a partial list of importations of cardinals for the years 1926 and 1927, compiled for the author by Dr. T. S. Palmer, the great number of birds brought to the state annually is surprising and illuminating. During the two years 1926 and 1927, 509 cardinals were brought into California, 221 of which went to southern California. Practically all these birds, according to Dr. Palmer, came from northeastern Mexico. Although these figures are not complete, the probability of the liberation or escape of cage birds is obvious, even though no record of deliberate introduction of the species is known. One can not help but feel that, from time to time, a number of the races of cardinal have had at least some opportunity to become established in California. Doubtless *canicauda* from northeastern Mexico has had frequent opportunity for establishment. The bird protection laws operating in the United States, that reduce the number of *cardinalis* and *floridana* kept in captivity, and the extensive traffic in cage birds carried on by the Mexican people would tend to favor the introduction of *canicauda* and others of the more southern races of cardinal.

Whether some of the California birds are indeed *canicauda,* or whether this race having been liberated has been unsuccessful, is an interesting question requiring the collection of specimens. We are perhaps loath to endanger the precarious foothold that the species has now gained, by shooting any more birds. But, if the species becomes better established, and before there is time for selection to operate and alter the various introduced stocks, effort should be directed toward ascertaining the exact nature of the original implantation. The ecologic niche into which this species will fit, as well as its powers of propagation, dissemination and competition with other species are topics which will require detailed field observation in the future.

To summarize the present situation, the species, *Richmondena cardinalis,* in California, represented by the typical race *cardinalis,* and possibly also *canicauda,* is limited to a few birds resident in the willow-cottonwood association along the lower part of the San Gabriel River bottom in southern California. So far as known, cardinals do not as yet occur regularly anywhere else in the state. The established colony doubtless owes its origin to the liberation or escape of caged birds.

Museum of Vertebrate Zoology, University of California, Berkeley, April 21, 1928.

FROM FIELD AND STUDY

Bears and Birds' Eggs.—Mr. Taverner's note (CONDOR, XXX, 1928, p. 157) drawing attention to an observation made by Mr. Henderson of Belvedere, Alberta, on bears climbing trees in which are hawks' nests, suggests that it may be worth while to comment on another egging activity of the black bears. Several instances have been brought to my notice of these animals hunting ducks' eggs on a wholesale scale. Although outside my personal experience, there seems no doubt that bears, certain individuals at all events, will systematically work the edges of lakes and for a time live almost exclusively on ducks' eggs. How common the habit may be I have no idea; but the fact that I have heard the same thing from three or four independent sources suggests that it may not be of such rare occurrence.

With regard to Mr. Henderson's observation, I noticed when collecting wood bison in the extreme north of the Province where the black bear is abundant, that trees with hawks' nests in them formed only a small percentage of those that had been climbed. Here and there were trees that had been heavily scarred as though they were particularly popular; but none of these contained nests. A scarred trunk and a hawk's nest are probably often but a fortuitous combination and mere coincidence. It would be decidedly interesting to get ocular and conclusive evidence as to the inferred procedure.—WILLIAM ROWAN, *Edmonton, Alberta, April 2, 1928.*

Some Winter Records from Montana.—The following notes from my records and those of my brother are of winter occurrences of birds for which, in "A Distributional List of the Birds of Montana" (Pacific Coast Avifauna No. 14), the one inclusive reference on Montana birds, A. A. Saunders cites only one or a few winter records; or in some cases, no instances of occurrence in winter. The period covered by our notes dates from January 1, 1921, and extends through the winter just ended. The instances of winter occurrence given here are largely the result of chance observations in a few parts of the state, and can not be taken as an index to the winter status of any of the species in any of the localities mentioned. They are considered worth publishing because of the absence or rarity of previous winter records of the several species in Montana. Except in one case, as noted, these records are based upon sight identification.

Barrow Golden-eye *(Clangula islandica).* December 20 and 22, 1926, one seen in Kootenai River, at Libby. December 7 and 22, 1927, two seen near Fortine. Recorded by my brother, D. R. Weydemeyer, near Fortine on the following dates: December 25, 1921; January 15, 21 and 29 and February 4 and 25, 1922; February 7, 13, 14, 15 and 17, 1923.

Buffle-head *(Charitonetta albeola).* December 21, 1925, Kootenai River near Jennings, and Whitefish Lake. November 2, 1926, Kootenai River at Libby; November 14, 1926, Fisher River, near Libby. November 6, December 19 and 22, 1927, in a slough near Fortine.

Sora *(Porzana carolina).* On December 2, 1927, at Fortine, in a spring-fed slough that never freezes over in winter, we caught a Sora in a trap set for muskrat.

Killdeer *(Oxyechus vociferus).* Observed along the Kootenai River at Libby on the following dates: December 30, 1925, seven seen; December 20 (two) and 22 (five), 1926; January 23, 1927 (one). My brother noted this species at Eureka commonly during October, and on November 4, 14 and 27 and December 4 and 9, 1921.

Marsh Hawk *(Circus hudsonius).* One noted November 15, 1922, at Fortine. One seen at Moccasin, Judith Basin County, December 16, 1925.

Sharp-shinned Hawk *(Accipiter velox).* Observed at Bozeman on the following dates: February 6, 1922; November 14 and 24, 1922; January 25 and 27, 1923; December 11 and 12, 1924.

Western Goshawk *(Astur atricapillus striatulus).* November 6 and December 25, 1922, at Bozeman. November 21, December 1 and 22, 1927; January 2, 18, 21 and 25, 1928, at Fortine. Recorded by my brother at Fortine January 1, 1923.

Desert Sparrow Hawk *(Falco sparverius phalaena).* January 27, 1921, one at Fortine. December 20, 1925, one near Great Falls. Observed at Bozeman on the following dates: November 4 and 20 and December 15 and 25, 1922; November 1,

2, 5 and 11, 1923; January 7, 1924; November 26 and December 11 and 23, 1924; January 16, 17, 27 and 29, and seven days during February, 1925.

White-winged Crossbill *(Loxia leucoptera)*. December 22, 1926, twenty-four seen in mountains near Libby; February 7 and 27, 1927, same locality. December 22, 1927, two seen in mountains near Fortine.

Slate-colored Junco *(Junco hyemalis)*. January 23 and February 16, 1921, at Fortine, one bird each time. A bird of this species, in company with Oregon Juncos, visited my feeding table at Libby every day except seven from January 14 to March 20, 1927.

Oregon Junco *(Junco oreganus)*. Four to six juncos identified as belonging to this species visited my feeding table at Libby on December 28, 1926, and every day except three from January 14 until April 3, 1927. They were watched through a window at a distance of a few inches, and one was examined in my hands.

Red-breasted Nuthatch *(Sitta canadensis)*. At Fortine we found this nuthatch common all during the winter of 1920-21, and fairly common the following winter. A few individuals were observed on November 10, 12 and 27, and December 22, 1927; one was seen January 5, 1928. At Libby, I found the species occurring commonly in the Canadian zone during November and December, 1926; a few were seen on January 10, and February 7 and 27, 1927.—WINTON WEYDEMEYER, *Fortine, Montana, March 15, 1928.*

California Black Rail in Los Angeles County.—On a field trip to the Playa del Rey marsh, February 25 of this year, an adult California Black Rail *(Creciscus jamaicensis coturniculus)* was found impaled on a barb wire fence that crosses the salicornia from the Pacific Electric tracks. The fact that the body was impaled, points to the work of a California Shrike. Due to the mutilated condition of the body, only the feet and a wing were preserved. The measurements of wing and tarsus correspond perfectly with those given in Bailey's "Handbook", while the speckled coloration and size of the wing proved convincing. The record has been verified by Dr. Loye Miller of the University of California at Los Angeles. There appear to be no recent records of the occurrence of this rail in this locality.—JOSEPH EWAN, *Los Angeles, California, March 13, 1928.*

Unusual Singing of the Eastern Chewink.—In THE CONDOR (XXIV, 1922, pp. 193-203) appeared a paper by Richard Hunt entitled "Evidence of Musical Taste in the Brown Towhee." In the same magazine (XXV, 1923, p. 134) further observations along the same line were recorded by the same author in a paper entitled "Another Musical Brown Towhee." Hunt in these articles is speaking of a western species of towhee, *Pipilo crissalis*. He heard the type of song in question on June 22, 1919, in the Santa Lucia Mountains, Monterey County, California, and again on May 2, 1922, in the Botanical Garden at the University of California. He says of this song: "Over and over again the bird sang the typical 'bouncing' song of the species, plus a low bubbling warble of four syllables." "They were low in pitch, and were sung softly, almost as if whispered." Hunt has discussed his theories accounting for this anomalous singing rather fully, and is inclined to believe they indicate a racial rather than an individual behavior.

I will now relate similar experiences with our eastern Chewink *(Pipilo erythrophthalmus)* which I observed in North Carolina while attending the University of North Carolina at Chapel Hill during the winter of 1904. I shall give all my journal records bearing on this strange winter singing of these birds, which passed the winter in a patch of woods there.

February 12, 1904. "Through the winter I have heard a squeaky, unusual song, if it can be so called, which I could not identify. This morning I saw a handsome male Chewink in full view on a low tree, uttering a strange, squeaky song. Is it its winter song? It was interspersed with its familiar *tur-ee - tur-ee*. It finally flew into the under-brush with a lively *tur-ee - tur-ee*, frequently repeated, as if surprised at its own strange, unfamiliar musical efforts."

February 28, 1904. "In the woods back of the Dissecting Hall, I find the Chewinks ever busy, lively, cheerful. I have this winter become acquainted with a new expression of this bird, it seems quite unknown to students of birds, and unlike its

summer song in every quality, so expressive of calmness of spirit, contentment and friendship. This new expression which I have had every opportunity to listen to carefully, watching the singer at close range, has not before been described or even so much as mentioned. Yet it seems to be rather a common expression among my chewink company in the woods mentioned, where they have dwelt, males and females, the livelong winter. Early in the winter, I was surprised to hear a peculiar bird expression delivered for some seconds in a sweet conversational way, somewhat hushed in quality. It is an almost indescribable song-babble or warble, the notes uttered in succession, with warbler-like variations. I could not at the time name the songsters; but it was not long, one morning, till I came close to the performer, a Chewink perched on a small tree singing in this new voluble fashion, interspersing his expressions with his familiar well known *tur-ee - tur-ee - tur-ee,* now uttered in an excited manner.

"This morning I again heard the Chewink at his early morning soliloquy, in the same manner as before, and watched him at a distance in a small tree, while his companions responded. Methinks this new expression of the Chewink, usually considered limited in his vocal abilities, to his usual alarm note *tur-ee* or *chee-ree,* and his short, sweet direct summer song, deserves some mention; for if it has been observed it has received no attention. Yet I doubt not if I ascribe this new note to the Chewink, increasing his known vocabulary, many will be inclined to treat it with incredulity. I have paid especial attention to the expressions of birds, and find them varied more than one usually thinks."

March 2, 1904. "This morning gave me a rare treat at close quarters with several Chewinks in their thicket-home back of the Dissecting Hall. It was a happy courtship scene, in which brilliantly attired males were trying to win the approval of the female. Again I heard its new, mysteriously soft, affectionate expressions, almost a subdued whispering chant, warbler-like. Only a few feet away, I watched the singer. It is evidently his true love-song or murmur, remotely reminding one of the Bobolink's sweetness at times, and delivered while in company with the females, and doubtless during the active courtship period, for I am well acquainted with the Chewink in New England, during its nesting season there, and know only its one sweet song. These new expressions seem intended for the females, at least bubble out spontaneously in their presence, frequently interspersed with an impatient *tur-ee - tur-ee - tur-ee.* As nearly as I can describe them, and their ecstatic spontaneous outflowing almost forbids it, they are very low, sweet complicated windings, composed of the briefest notes. It is a sweet, voluble expression of an earnest, enthusiastic soul it seems."

These complete my records of this unusual winter singing of the Chewinks. It is possible it is the usual winter song of the species, for I have never heard it in the nesting season in New England. On the other hand, during these performances or at any other time during the winter I did not hear the usual sweet ringing summer song delivered *dont - you - e-e-e-e-e-,* and *see me-e-e,* as it has always sounded to me, both ending with a ringing trill. Thoreau has aptly described it as *"whip your ch-r-r-r-r-r-r-r,* with a metallic ring."

Perhaps the entire Chewink race is more voluble than we have suspected, or perhaps the Chewinks like many other birds have definite seasonal variations to their songs. I do not believe this a merely casual individual behavior, but a fixed species behavior if the full truth were known of its winter habits.

Hunt elaborates rather fully on the behavior of his western towhee, feeling that "the songster is an esthete," consciously aware of deliberate improvements in his song. So his towhees to him appear to have borrowed deliberately the song of the Western House Wren as something especially fine and worthy for their art indulgence, as one loves the beauty of particular poems among humans, and would recite them now and then. It is very difficult to get at any truth concerning an animal's esthetic sensibilities, yet they may be there, even though not capable of a human evaluation. More than one person has believed that birds have a real ear for music, as does Xenos Clark, who believes that in the evolution of their songs they feel certain laws of harmonics. I am almost willing to believe anything concerning life, but sometimes I wonder just how much consciousness of directiveness is back of it all. Perhaps the bird is no more consciously concerned with an elaboration of its song than with those marvelous elaborations of its beak, or its color

pattern, or its crest or its tail feathers. Song as one phase of living behavior has gone very far with some species nevertheless, so much so that Schuyler Mathews has said, "Nearly all birds sing in strictly measured time, many sing a perfect bar, or measure, and a considerable number, several bars;" and "we have convincing proof that their music is built upon definite primitive scales—scales which the birds used aeons of years before man did." Speaking of the Hermit Thrush, this author says, "Somehow or other the motives of the Hermit all fit together in a remarkably harmonious fashion, and it is a very simple matter to combine the antiphonal songs of two singers so they form a unit of musical thought."

There has been much observation and thought concerning the origins of bird music and insect music. The impulse is as deep as life, but how and why can be only matters of eternal speculation, and that solves nothing. Birds and insects appreciate sound in their elemental way as thoroughly as men. Somehow their songs unfold in harmony with the deep mysterious developing laws of life, just as specializations of their feet, feathers, bill, etc. We know not one thing about it, however. I would at times think it were a blind rhythm of development in the life of the bird as much as something conscious for the reason that we have marvelous specializations in the inanimate, as among snow flakes. Hundreds of different crystalline forms of snow flakes are known, some simple, others marvelously refined and specialized, yet formed within the same apparently homogeneous water, H_2O, within the same hexagonal system of crystallization. Depending upon some fine internal or external conditions, the snow flake may take on almost any form, and perhaps there are thousands of variations men have not yet seen. So it is easy to believe that life may develop complexities like the snow flakes themselves through no living control, or perchance with living control thrown in where we least expect it. The question is not going to be solved soon.

Birds have weird plasticities of behavior, as does all life, and I am convinced Chewinks are only just beginning to show us a few traits in their songs because we have stumbled upon them. Perhaps the entire Chewink race of America has this offsinging behavior observed by Hunt and myself, he in the far west, and I in the east.—H. A. ALLARD, *U. S. Department of Agriculture, Washington, D. C., January 18, 1928.*

Field Notes on Certain California Birds.—*Erismatura jamaicensis.* Ruddy Duck. In Grinnell and Wythe's "Directory to the Bird-life of the San Francisco Bay Region" (1927), this species is mentioned in terms indicating that it is rarely found on salt or brackish water in that region except in the winter months. On July 10, 1927, I had a good view from the train of a flock of about six males in Richardson's Bay, in the vicinity of Elmonte, a station near Sausalito, Marin County.

Colaptes cafer collaris. Red-shafted Flicker. In A. B. Howell's "Birds of the Islands off the Coast of Southern California" (1917), this species is recorded from Santa Catalina Island only during the winter. On June 11, 1927, I saw a male in a small tree in a canyon near Avalon, perched close to a hole that probably contained his nest. Not being aware at the time that the species was not known to breed on the island, I did not investigate further.

Sitta carolinensis aculeata. Slender-billed Nuthatch. On June 22, 1927, I saw my first bird of this subspecies in trees near Lagunita, Stanford University, Palo Alto. A few minutes later, while I was inside the little bandstand near the shore of Lagunita, Mrs. Blake, who was outside, saw him fly up under one of the tiles on the roof and disappear. During the rest of the summer, up to the time we left Stanford, he was found going to bed there nearly every evening we were able to look for him, his choice of chamber varying from the corner tile to the eleventh tile from the end. His approach was usually announced by his call from among the Monterey pines planted around the lake, after which he would appear in a pine close to the bandstand, climb up and down and "yank" a few times, and then fly up and out of sight under a tile. His hour of retiring, usually just before the sun disappeared, corresponded in a general way with the decrease in the length of day, as follows (time of sunset, furnished by the U. S. Weather Bureau, in parentheses): June 29, 7:25 p. m. (7:35); June 30, 7:24 (7:35); July 5, 7:13 (7:34); July 9, 7:10 (7:33); July 20, 7:03 (7:28); July 24, 7:04 (7:25); August 5, 6:54 (7:14); August 20, 6:43 (6:57); August 26, 6:38 (6:49).

On two occasions, two nuthatches were seen together near the bandstand, but only one was ever seen to enter a tile. On two or three evenings, a nuthatch appeared as usual, but was evidently disturbed by our presence and made off in another direction. On three occasions a Plain Tit was seen to go under a different tile, about five minutes after the Nuthatch, and once a Red-shafted Flicker disappeared under a tile, but flew out when I walked up.

Psaltriparus minimus minimus. Coast Bush-tit. On June 27, 1927, I collected in Palo Alto a deserted nest of this species containing eleven eggs. Eight of these were unincubated and were easily blown, while the others were dried up or rotten and more or less incubated. At least one contained a medium-sized embryo. This was evidently a case of the use of the same nest twice, presumably by one, of a pair, which had lost its mate.

Turdus migratorius propinquus. Western Robin. At least one pair, and probably more, nested at Stanford University in the summer of 1927. On July 23 a pair was calling noisily, as though with young, in shrubbery in the inner quadrangle of the University, and on the evening of that day the birds were vigorously pursuing a Barn Owl in the same place. Prof. L. R. Abrams informed me that he had not noticed them at Stanford in summer prior to 1927. —S. F. BLAKE, *Bureau of Plant Industry, Washington, D. C., February 17, 1928.*

Summer Record of the Cedar Waxwing in Yosemite Valley.—During early June, 1927, a member of the Nature Guide field party reported having seen a bird near Clark's bridge, Yosemite Valley, which when described fitted best the Cedar Waxwing. Mention of this fact brought out the further information that Mrs. Frank Ewing, a resident of the Valley, had seen a Cedar Waxwing in her yard about June 5 or 6, 1927. A day or two later a Cedar Waxwing which had become soaked with oil from one of the mosquito controlled pools was brought to the Yosemite Museum. On June 8, four birds were seen by Donald McLean near the Superintendent's office in the new village, and the next few days probably the same four birds spent their time in the cherry tree not far distant. Cherries were just starting to ripen at the time. So far as I have been able to ascertain, this is one of the first summer records for this bird for the Valley floor. Grinnell and Storer (Animal Life in the Yosemite) record a Cedar Waxwing in the higher mountains during the fall migration.—H. C. BRYANT, *Berkeley, California, March 30, 1928.*

A Record Set of Eggs of the Golden Eagle.—Although I have heard of two sets of four eggs of the Bald Eagle being taken, I have been unable to find any notation of a like number for the Golden Eagle *(Aquila chrysaëtos).* Therefore I wish to record a set of four eggs I was fortunate in finding in California near the beginning of March of the present year.

These specimens, which were practically fresh when taken, are very much alike in shape and nearly similar in size, measuring in inches 2.70 x 2.16, 2.75 x 2.18, 2.77 x 2.25, 2.80 x 2.28. While both in coloration and in markings the eggs are more uniform than those of the average set, except for the unusual number they are in nowise peculiar. It is interesting to note that the nest from which this record set was collected held but two incubated eggs in 1927, measuring 2.77 x 2.25 and 2.81 x 2.26.

Other noteworthy sets of eggs of Raptores that have been reported to our museum are a set of the White-tailed Kite *(Elanus leucurus)* with six eggs, taken in California years ago, and a set of the Western Red-tail *(Buteo borealis calurus)* with five eggs collected more recently by Mr. Jules Labarthe in Arizona.—MILTON S. RAY, *Pacific Museum of Analytical Oology, San Francisco, California, March 11, 1928.*

Bird Notes from Santa Catalina Island.—During the noon-hour of November 8, 1927, I saw two Cedar Waxwings *(Bombycilla cedrorum)* eating the berries from a holly tree near the Avalon High School, Santa Catalina Island. They were in a flock of probably twenty-five Gambel Sparrows and San Clemente House Finches. They were under observation for fully five minutes and flew away with the other birds only when I got within a few feet of them.

On the afternoon of January 1, 1928, on the south slope of Pebbly Beach canyon, near Avalon, I saw a male Sparrow Hawk *(Falco sparverius phalaena)* feeding in

the underbrush. On January 23, on the other side of the Pebbly Beach ridge, and about two miles from where the first bird was seen, I saw a female hawk resting on some light wires. One of my students found a dead male Sparrow Hawk on the coach road, near Camp Frost, on January 21, 1928. Its stomach contained a three inch Brown-shouldered Lizard. It is now number 329 in my collection. From reports it seems that the Sparrow Hawk is not at all rare on Santa Catalina Island.

These two birds are additions to Howell's list published in Pacific Coast Avifauna No. 12.

The Island Shrike *(Lanius ludovicianus anthonyi)* has been seen quite frequently in several localities on the east end of the island. They seem to have lost some of the fear noted by Howell, as several have been approached within twenty feet. So far this year, after a diligent search, no nesting birds have been found, though the Island Finches are beginning to build.—DON C. MEADOWS, *Avalon, Santa Catalina Island, California, March 19, 1928.*

A Mid-winter Anthony Green Heron.—On the first day of the year 1928, the writer was enjoying a few hours of recreation at Lindo Lake, a small body of fresh water near the town of Lakeside, San Diego County, California. This lake, through the far-sightedness of the County Board of Supervisors, has been purchased and set aside as a public park, with shooting prohibited. As a result, a great assemblage of unsuspicious water-fowl is to be found there during the winter months. A fringe of fair-sized willow trees skirts the lake on the west and south, and in one of these, resting on a leafless limb that hung close over the water, a solitary Anthony Green Heron *(Butorides virescens anthonyi)* was seen. Perhaps on account of this exposed position, coupled with a probably short residence about the lake, the bird seemed shy and soon flew, alighting in the uppermost branches of another tree farther down the shore. Twice the writer flushed this lone straggler from such elevated perches, when the heron, tired of being followed, took refuge on the opposite side of the lake and evaded further pursuit.—LAURENCE M. HUEY, *San Diego Society of Natural History, Balboa Park, San Diego, California, January 23, 1928.*

The Lichtenstein Kingbird on Vancouver Island.—A Lichtenstein Kingbird, *Tyrannus melancholicus satrapa* (Cabanis and Heine), was collected at French's Beach, Renfrew District, Vancouver Island, in February, 1923, by J. G. French. This bird was identified as above by Major Allan Brooks, through the interest of Mr. J. A. Munro, and constitutes a new record for the Province and for Canada. The normal habitat of the species is Mexico and southward; it may have strayed so far north through the medium of a steamer.—F. KERMODE, *Provincial Museum, Victoria, B. C., March 15, 1928.*

The Nuptial Display of the Buffle-head.—The Buffle-head *(Charitonetta albeola)* does not often give opportunity to study its nuptial display. Though the bird is common along the more protected portions of the coast of Vancouver Island every spring, I have only on two occasions seen it display. Bent in his Life Histories suggests shyness as the reason for not often seeing this display; but here, at all events, the Buffle-head is not a shy duck and can generally be studied at a distance of 100 yards, and much closer if care be taken.

In April, 1926, I was staying at Tofino on the west coast of Vancouver Island. There is here a large expanse of protected shallow water that provides a quiet refuge from the frequent winds on this coast. Buffle-heads were unusually numerous; my notes are that I saw in two to three hours rowing about, one morning, more than I had seen on the east coast of the Island (Comox) all winter. The birds were not in large flocks, but in parties of 15 to 20 or smaller. It was there I first saw the display.

The display consisted of the male rising from the water with a rather fluttering weak flight, flying a few yards and then "sliding" into the water, breast thrown out, making considerable splash. The male would fly towards the female, but immediately on settling on the water would turn away from her; the tail would then be jerked up and this jerking motion would be repeated. Next, with crest extended, the male would slowly swim in front of the female who, on no occasion that I saw, took

the slightest notice. I did not observe any jerking or bobbing of the head, and the impression was that the male pitched directly in front of the female and then turned around with the object of attracting her attention to his back and crest.

The day was sunny which may have induced the birds to display. I saw this display on four occasions and, once, had two birds in the same party displaying together. From this I would judge that displaying birds must have been common, as I was rowing myself in the boat and would disturb many before coming up to them.

The other instance occurred in this neighborhood on April 29 of this year. A party of four consisted of two full plumaged males, an immature male and a female; all three males were courting the one female. The display here was quite different from what had been seen at Tofino. The birds were all swimming together and one would depress its body (laying itself out on the water), shoot its head out vertically with the water, bobbing it back and forth in this way several times. While doing so it would slowly swim away from, but not actually in front of, the female. Another great difference was in the carriage of the crest; instead of being extended it was closely depressed. In fact there was no suggestion of crest left, only a narrow black line. The female showed no interest at any stage of the performance.

This shooting back and forth of the head was an action different from any I have seen in displaying ducks; the bird shot its head out to the full extent of the neck, bill carried out in a line, held it there, and then quickly drew it back and shot it out again without any pause. The manner of swimming flat on the surface reminded one of the action of the Surf Scoter when courting.

All three males took part in the display, but the immature bird did not appear so aggressive. The birds were about one hundred and fifty yards out from the shore and not at all frightened. They flew off, led by the female I thought, in a party.

At Tofino there appeared no jealousy among the males. I saw no suggestion of fighting; but on the other day, one of the old birds attempted to drive the other away by darting at it in the water.—THEED PEARSE, *Courtenay, B. C., Canada, May 5, 1928.*

Sixth Record of Harris Sparrow in California.—The recent records of the Harris Sparrow *(Zonotrichia querula)* in California reported by Clabaugh (CONDOR, XXX, 1928, p. 163), and by Cozens (*ibid.*, p. 164), prompted us to offer a sixth record of this sparrow. This bird was a member of a large mixed flock of Golden-crown and Gambel sparrows and Juncos which wintered near our house on High Court, Berkeley, in 1924-25. For several weeks it was seen daily at the feeding tray which was not more than ten feet from our window. Its plumage agreed with that of "first-year" specimens in the Museum of Vertebrate Zoology.

Other noteworthy birds in our flock that year were at least three Slate-colored Juncos *(Junco hyemalis)* and a White-throated Sparrow *(Zonotrichia albicollis)*, both previously familiar to us in the East. The White-throat remained until May 2 and was heard singing several times before it departed.—G. L. FOSTER and GRACE E. FOSTER, *Park Ridge, Illinois, May 7, 1928.*

Rufous Hummingbird in the Oklahoma Panhandle.—For a number of years I have been considerably interested in the study of hummingbirds; but until last summer (1927) I had records of only two species for Oklahoma. These were *Selasphorus platycercus* (Broad-tailed Hummingbird), a rare transient and summer resident in Cimarron County, and *Archilochus colubris* (Ruby-throated Hummingbird), a summer resident in eastern and central Oklahoma as far west as Comanche and Woods counties. Then on August 10, 1927, I discovered a lone individual of *Selasphorus rufus* (Rufous Hummingbird) here at Kenton, in Cimarron County.

This bird, which was a male, appeared to be extremely fond of the nectar in the flowers of a trumpet vine at one end of the screened-in porch that extends along one side of my house; and it was in this vine that I first saw him. I had been attracted to that side of the house shortly after sunrise that morning by a peculiar sound, somewhere between a buzz and a grunt, but had failed to locate the cause at that time. Shortly after lunch I again heard the same peculiar sound and, after gazing out through the open spaces in the leaf-covered vine for several minutes without moving, finally discovered the bird within three feet of my face, as he hung poised before a flower from which he was feeding.

The first day I watched the hummingbird for over half an hour. On the 11th he failed to return, but on the 12th he was back at the vine bright and early, and he returned again at noon, when I watched him closely for over an hour. On the 13th two males spent most of the day in and around the vine and were back again on the 14th and 15th; but they were not seen after that until August 29, when they or two other males were again at the vine. On September 1 the two again feasted on the nectar from the reddish-brown flowers of the vine and I had hopes of seeing them there again the next day; but during the night a rain and wind storm swept over the region from the north and evidently carried them on toward the south, as I never saw them afterward.

While the two individuals observed last summer were possibly not the first of the species to visit Oklahoma during their migrations, they were nevertheless the first individuals ever reported seen here, and for that reason they give us the first authentic record of the Rufous Hummingbird for Oklahoma.—RALPH C. TATE, *Kenton, Cimarron County, Oklahoma, April 28, 1928.*

Reddish Egret on Los Coronados Islands, Mexico.—On May 6, 1928, while on a trip to Los Coronados Islands, Baja California, Mexico, with the members attending the Third Annual Meeting of the Cooper Ornithological Club at San Diego, we observed a Lower California Reddish Egret *(Dichromanassa rufescens dickeyi)* rise from a colony of nesting California Brown Pelicans and circle in full flight for some time about the east side of the island (Corpus Christi). The bird was first seen by Mr. W. H. Thorpe, of the British Ornithologists' Union, England, who, being rather unfamiliar with American birds, described it to us as a crane-like bird with a blue body and reddish neck. At first, from his description, we supposed it to be a Great Blue Heron, but we readily identified it as a Reddish Egret later, when we saw it "take off" from the pelican colony. When last seen it was flying toward the south island. The bird was also seen by Mr. Wright M. Pierce, as well as others of the party, who confirmed our identification. We are familiar with a mounted group of these birds in the Natural History Museum, San Diego, and feel that there is no possibility of error. As this is far north of the bird's regular range, we believe it to be worthy of record.—JACK C. VON BLOEKER, JR., and SAMUEL G. HARTER, *O'Rourke Zoological Institute, San Diego, California, May 7, 1928.*

Band-tailed Pigeon Nesting in Arizona in September.—On September 9, 1923, while at Soldier Camp in the Santa Catalina Mountains on a hiking trip, my attention was called to a pair of Band-tailed Pigeons *(Columba fasciata)* working in the western yellow pine over the ranger cabin. Observation with an 8-power prism binocular established the fact that they were engaged in the construction of a nest. It was difficult for me to believe that nest building was being done at so late a date. Some hours later the same day, on returning from the hike, these observations were again checked. The birds were under observation for a total of not less than an hour. I hoped to secure from the ranger or others further information as to whether young were actually reared, but learned nothing more. At the time, I believed this was an aberrant occurrence, but from a recent note (Grinnell, CONDOR, XXX, p. 126) I am lead to wonder whether it may not have been a normal nesting.—CHAS. T. VORHIES, *Tucson, Arizona, May 9, 1928.*

Do Willow Downy Woodpeckers Ever Drill in Tree-bark?—In course of conversation, recently, Mr. Charles W. Michael intimated that Grinnell and Storer, in their book, "Animal Life in the Yosemite", had been mistaken in ascribing certain drillings in the bark of apple trees to Willow Woodpeckers *(Dryobates pubescens turati)* rather than to Red-breasted Sapsuckers. To be specific, the mistake in question, if such it be, involves the text on pages 318-319, and text figure 41, of the book cited. The observations there recorded were made in Curry's apple orchard, on the floor of Yosemite Valley; and the great number of punctures observed in the trees there were ascribed not only to the Willow Woodpecker but in part also (see page 329) to the Red-breasted Sapsucker.

At my request, Mr. Michael has set down his own observations and final conclusions (in letters of April 28 and May 11, 1928), which read in part as follows:

"Regarding the apple-tree situation in the Yosemite Valley, Mrs. Michael and I believe that you and Mr. Storer convicted the Willow Woodpecker on circumstantial evidence. So long ago as the winter of 1920-21, we became convinced that the bark drillings in the apple orchard were [all] the work of the Red-breasted Sapsucker. . . . For several years now the apple orchard has been under observation, and during this time many Red-breasted Sapsuckers have been seen drilling sap-pits, but never once have we seen Willow Woodpeckers doing work of this sort. Furthermore, sap-pits that we saw the sapsucker drill have since healed over and now appear precisely as do all the other old scars."

Accompanying the first of these letters is a carefully drawn-up account of the Michaels' observations on the behavior of the Red-breasted Sapsuckers in the Curry apple orchard. It is their belief that "all the vast amount of cutting might have been the work of one or two of these birds [sapsuckers] working only during the winter months." For thirteen consecutive days a single sapsucker was watched at work, and the process of drilling was observed at times within a distance of 6 feet. "In almost every case these fresh holes were cut through the bark into the sap-wood. In old workings of the sapsucker all of the holes bore evidence of having been cut through the bark to the sap-wood, and in the fresher holes there was no question in this regard, as in the bottoms of these pits dried sap could be seen."

On going back to the original field notebooks kept by Mr. Storer and myself, I find that, as recorded in our book, one or more Red-breasted Sapsuckers, and work ascribed to that species, were seen from time to time in Curry's apple orchard; but that also, on November 8, 1915, the two of us found and watched Willow Woodpeckers there. The facts are precisely as recorded, the chief of which are that two birds of the latter species were watched at certain fresh pits. One of these birds shot subsequently the same day, as per my notes showed "bits of inner apple-bark adhering to bristles around base of bill, showing [seemingly to me at the time] that he had excavated the pits." This bird, a male, is now number 25894, Mus. Vert. Zool.

As set forth in our published report, the pits with which the Downy Woodpecker appeared to be identified were not deep enough to scar the heart-wood, and hence were construed to be essentially different from the pits in the same orchard that were made undoubtedly by the Red-breasted Sapsucker. Our interpretation was that these shallow pits did not, therefore, injure the trees, at least to the extent that the deep ones regularly made by the sapsucker do.

Mr. Michael, in his letter of May 11, admits that the Willow Downy Woodpecker might well be able to drill through the bark of an apple tree; but nevertheless he is "inclined to believe" that the birds we "had under observation were merely looting the honey-pots of a Red-breasted Sapsucker and that they had themselves done no actual work in excavating the pits." Furthermore, "If Willow Woodpeckers occasionally do work similar to the work of the sapsucker it seems reasonable to suppose that we [the Michaels] would have discovered such work when no sapsuckers were present in the Valley. Months go by when no sapsuckers are present, but there is never a month when Willow Woodpeckers are not present. It is hard to believe that Willow Woodpeckers drill holes in the bark only when there is a Red-breasted Sapsucker present in the orchard! . . . I think," he says, "that the inferences made by Grinnell and Storer were absolutely wrong."

Now it is, indeed, quite possible that the authors of the Yosemite book thus inferred wrongly. The facts, of two Willow Downy Woodpeckers being observed at fresh shallow pits, and that one of them shot showed inner bark fibers adhering to the bristles around its bill, may have been just coincidence, as Mr. Michael says—a case where one species, which does not perforate bark, has taken casual advantage of a food source provided through the habits characteristic of another species. Several other totally different species of birds are already well known to profit through the bark-boring of sapsuckers. Here is a point requiring further close observation, best by persons coming fresh to this problem, without any preceding "slant" either way. Were or were not the inferences made by Grinnell and Storer likely to have been "absolutely wrong"? Has anyone observed a Downy Woodpecker, of any western race of this species, actually "drilling" tree-bark? Incidentally, this same sort of discussion, concerning the Eastern Downy Woodpecker, is carried on interestingly and at length in volume II (1927) of Forbush's *Birds of Massachusetts* (pp. 263-270). —J. GRINNELL, *Museum of Vertebrate Zoology, University of California, Berkeley, May 16, 1928.*

Generic Re-assignment of Morphnus daggetti.—In 1915 the present writer published in THE CONDOR (XVII, p. 179) a brief description of a long-shanked eagle from the Rancho La Brea Pleistocene which was assigned to the genus *Morphnus*. The species *(daggetti)* was again referred to in a general paper on Rancho La Brea submitted in 1916, but which, owing to war conditions, was not issued until 1925 (Publ. Carnegie Inst. Wash., 349, p. 97). The tibio-tarsus was here discussed, and the former impression of reduced predatory habit was reaffirmed.

Since these publications were issued, new fossil remains have appeared in the Carpinteria asphalt, and new comparative material from tropical America has become available. It has long been my own feeling that the assignment of the bird to the genus *Morphnus* was at the time of the original announcement the lesser of two evils, but that a review would ultimately become necessary. My very generous coworker and friend, Dr. Alexander Wetmore, urged the step some time ago and, with the present enlarged opportunity for comparison, the time seems now ripe for such discussion.

Among the eagle tarsi from the newly developed Carpinteria beds, the most abundantly represented species is *Morphnus daggetti*. Others present are *Geranoaëtus grinnelli*, *Geranoaëtus fragilis*, *Geranoaëtus* sp., and *Neogyps errans*, all extinct species, known from the tarsus. Of these eagles, *M. daggetti* runs to maximum size, as judged by stoutness of the bones, although size differences are so slight that there is almost an intergradation down to the smallest *G. fragilis*.

Unfortunately, none of the specimens of the Daggett Eagle is entire; but fragments are numerous enough to indicate more individuals than were retrieved from the entire Rancho la Brea excavations. Since all specimens from Carpinteria have suffered fracture, it is furthermore impossible to determine the exact length and the relative position of the papilla of the tibialis anticus; but by placing the fragments alongside each other in the proper positions, an exceedingly close conformity with the type is evident and no hesitation is felt in assigning the Carpinteria specimens to the same species as the Rancho La Brea bird.

Morphnus guianensis is available for this study only as a carefully made cast, later fractured, taken from a right tarsus in the British Museum. It represents a bird smaller than the maximum of *Archibuteo ferrugineus*, but with decidedly longer and weaker tarsus. *Spizaëtus ornatus* (Daudin), another morphnine, is available from the collections of D. R. Dickey. Other neotropical raptors, including a fair series of *Urubitinga urubitinga*, are available in the collection of Mr. Dickey and in that of the writer. Elongation of the shank in *Morphnus* and *Spizaëtus* falls far short of that seen in the urubitinga group, where it reaches the same grotesque degree seen in the Pleistocene Daggett Eagle. In fact with this recent material available there is no hesitation in placing the Pleistocene bird nearer to *Urubitinga* than to *Morphnus*. It is a truly eagle-sized bird, however, ranging in weight above the largest *Aquila* at hand. Aside from the heroic size, there appear numerous osteological differences that demand the establishment of a distinct genus for its accommodation. Such category is here proposed, as follows:

WETMOREGYPS, new genus, type *Morphnus daggetti* Miller

Generic characters.—Size equal to, or greater than, *Aquila;* tarsus extremely elongate; papilla of tibialis anticus placed high up on the shaft, resulting in a ratio of power arm over weight arm of approximately 12.5 per cent; superficial resemblance to *Urubitinga urubitinga*, but less excavated on the antero-proximal face and with trochleae more nearly of equal size and elevation.

Additional points of divergence from *U. urubitinga* include the following: (1) Inner cotyla exceeds the outer to a greater degree; (2) sagittal diameter of head greater in relation to transverse diameter; (3) outer hypotarsal ridge lower but broader; (4) scar of the distal rudiment of metatarsal 1 shorter and placed centrad from the inner profile of the bone; distal foramen placed lower down.

Urubitinga is not a walking bird as we observed it in El Salvador, since it was always met with in the forest association. *Polyborus cheriway*, which is an excellent walker, was also abundant in this same association. Both birds impressed us as rather poor predators, and the strong superficial resemblance of the Daggett Eagle to these weak-footed and small-mouthed raptors suggests a similar habit.

Chaney and Mason's study of the fossil flora of Carpinteria (Science, LXVI, 1927, no. 1702, p. 156) indicates a forested area during Pleistocene. It may, then, be a purely ecologic factor that makes the Daggett Eagle the most abundant of raptors in that deposit, the rarest at Rancho La Brea, and entirely wanting at McKittrick.

The new generic name here proposed is in honor of Dr. Alexander Wetmore of Washington, D. C.—LOYE MILLER, *University of California at Los Angeles, May 29, 1928.*

EDITORIAL NOTES AND NEWS

An indication of the progress being made in bird banding in Western North America is given by the Census of Birds Banded in the Western Province for the calendar year 1927 on pages 14 and 15 of the April, 1928, number of *News From the Bird Banders*, published by the Western Bird Banding Association. Totals of 160 species and subspecies, and 18,891 individual birds are shown, which are substantial increases over the corresponding figures of 145 and 11,445 for 1926. The birds represented by these census figures, and those for previous years, have been the basis of a considerable amount of study, some of the results of which have appeared in THE CONDOR, in papers presented at Cooper Club meetings, and elsewhere.—H. M.

A correspondent makes the pertinent suggestion that we emphasize the impropriety of anyone's writing extensively for publication without reading what has been written on the same subject by others within at least the preceding five years. It is pointed out that there seems to be a marked tendency of modern bird students to ignore preceding literature; too many current contributors publish regularly on the basis of their own personal background of experience exclusively. Surely, there can be no argument for such narrow individualism. Real advance in knowledge must be based on the aggregate experience of all investigators insofar as it is available. The complaint is made, with which we hold some sympathy, that literature has accumulated to a point where it is practically impossible for a person to be sure he has found all previous contributions even in his own section of the general field. But, again, it certainly *is* possible for a prospective author to acquaint himself with what has appeared in the chief ornithological magazines during the relatively brief preceding period of five years or so.—J.G.

Prospective contributors to THE CONDOR should understand that we accept articles only on condition that they are submitted for use exclusively in this magazine. In other words, we feel strongly that we are not justified in printing in our magazine any article already published elsewhere, no matter how seemingly important, or in what other periodical printed. There is rarely any excuse at all for simultaneous publication of the same article in two or more journals; it is a waste financially and is not in the interests of bibliography. We are distressed to find that the Golden-crowned Sparrow record from Massachusetts printed in our May issue had also appeared in the April issue of *The Auk*. May *Condor* was in press before April *Auk* reached us, and we had no information previously that any such duplication was in prospect.

The Boston Society of Natural History has just published, in its Proceedings (volume 39, April, 1928, pages 33-72, plates 4 [portrait] and 5), a biographical sketch of Edward Howe Forbush, who is just this year retiring from his position as Ornithologist of the Commonwealth of Massachusetts. This biography is written by John B. May who, we understand, succeeds Mr. Forbush in office. We have read the biography with keen interest,

especially that part of it in which Mr. Forbush's own account is quoted, of his visit in 1888 to the coast of British Columbia. Here, again, the modern collector can have little understanding of the hardships and real adventure experienced by the explorer in the West forty years ago. Incidentally, it was during that trip to British Columbia that Mr. Forbush collected the type of the race of Lincoln Sparrow designated by Brewster as Forbush's Sparrow.

William Leon Dawson died suddenly, of pneumonia, in Columbus, Ohio, on April 30, 1928. We are informed that he was actively at work upon a new edition of his *Birds of Ohio*, and that he was also of late giving his winters to the study of the birds of Florida with the aim ultimately of publishing a similar work on the birds of that state. Both of these publications were to have been patterned after the artistically and literarily monumental *Birds of California;* but the financial organization formed to make the carrying out of these plans possible will now necessarily be dissolved. A biography of Mr. Dawson appeared in THE CONDOR for 1913 (vol. XV, pp. 62-69, portrait).

A recent publication in the economic field is the privately printed "Study of the Economic Status of the Common Woodpeckers in Relation to Oregon Horticulture", by Johnson Andrew Neff. The work upon which this contribution is based was done by the author during the period 1924-26 at Oregon Agricultural College. While the text takes much account of previously published information, there is also included a considerable proportion of original material. This brochure thus should be acquired by everyone interested in the field of its subject. Copies may be had at a cost of $1.50 by addressing the author at his home in Marionville, Missouri.

We learn that a new book is about to appear from the pen of Florence Merriam Bailey. This one will deal with the "Birds of New Mexico", to which subject it is well known that Mrs. Bailey has been giving much study for several years past. The book will be abundantly illustrated, from twenty-three original colored drawings by Allan Brooks and one drawing by Fuertes. In addition there will be many black and white drawings and maps. The book will be printed in Washington, D. C., and every effort will be expended toward making this in all respects one of the best of Western bird books. The selling price of the book will be $5.00, and advance orders may be filed with our fellow member, Mr. R. T. Kellogg, Silver City, New Mexico. Since the cost of this publication has been underwritten privately, the sale price has been fixed to exclude any margin of profit. The date of publication will be during the coming autumn.

A new sportsmen's organization has been founded, to be known as The American Wild Fowlers. Its president is Dr. John C. Phillips, whose office address is 508 Lenox Building, Washington, D. C. The plan of this organization is simple, and it is now financed on a three year basis without any attempt to enroll a large membership. Its aims are to do everything possible toward the conservation and increase of wild fowl (ducks and geese) throughout the country. A recent announcement contains many statements which we are inclined warmly to support; from these we select for quotation the following: "We want information on all of the following points: shrinkage of surface water through drainage and through the effects of agriculture (especially in the Prairie States); the existence of all legitimate shooting clubs; the onset of any adverse factors affecting the duck supply, such as disease, oil pollution, duck sickness, over-shooting, or unusual conditions on the breeding grounds. Lastly, we want really worth-while statistics showing actual kill of birds at various points, so that eventually with the help of State records we may form a close estimate of the numbers of birds shot each season. This, taken together with adequate returns from the census now in progress under the Biological Survey, and with increased knowledge from banding, will give us a more rational basis for determining the proper methods of handling what we believe is a really great national resource." A specially commendable thing is the aim of this organization to coöperate closely with the United States Biological Survey and to resist any legislative effort designed to take away from that Bureau the authority necessary properly to administer the migratory bird life of the nation. The names of the persons as-

sociated with the American Wild Fowlers guarantee that here is an organization of sportsmen with the caliber to exercise their influence intelligently from the scientific natural history standpoint.—J.G.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

APRIL.—The April meeting of the Northern Division of the Cooper Ornithological Club was held at 8:00 p. m. on April 26, 1928, in Room 101, Zoology Building, University of California, Berkeley. Minutes of the Northern Division for March were read and approved. Minutes of the Southern Division for March were read. The name of Miss Clara M. Stedman, 3871 Howe St., Oakland, Calif., was proposed for membership by J. Grinnell.

Mr. Brighton C. Cain and Mr. Philbrick Smith called attention of those present to the exhibition of birds proposed in candidacy for State Bird at the Oakland Public Museum. Mr. C. B. Lastreto read a newspaper clipping announcing a proposed blue jay shoot; this was commented upon by several members. Mr. Harwell reported a colony of about 25 Cliff Swallows nesting in Oakland. Mr. Grinnell reported having seen males of four species of hummingbirds in Strawberry Canyon on April 21. Mr. Storer announced that on an April Sunday Mr. Clabaugh and himself had seen 42 species of birds in the Solano hills. Mr. Mailliard told of the continued presence of the albino Ruddy Duck in Golden Gate Park and said that it had been seen on nearly every one of the lakes there.

Speakers of the evening were Mr. Joseph Mailliard and Mr. H. S. Swarth. The latter spoke upon the bird-life of Arizona in general and the changes which have come about since early collectors combined the avocation of bird study with the vocation of protecting settlers from Apache raids. Most of these changes Mr. Swarth found were caused either directly or indirectly by the over-grazing of the cattle ranges.

Mr. Mailliard's talk, which was illustrated by slides, dealt with the Santa Rita Mountain region of southeastern Arizona, where he had camped both spring and fall about seven miles north of the town of Patagonia. Mr. Mailliard enumerated the species he found about the ranch house there, with its grove of cottonwoods, and then those species found in the drier and more sparsely inhabited areas. Adjourned.—HILDA W. GRINNELL, *Secretary.*

SOUTHERN DIVISION

MARCH.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Southwest Museum, Los Angeles, on March 27, 1928, at 8 p. m., with President Chambers presiding. About forty members and friends were present. The minutes of the February meeting of the Southern Division were read and approved. The minutes of the February meeting of the Northern Division were read.

The following applications for membership were read: Charles Harlan Abbott, Professor of Zoology, University of Redlands, 28 South University St., Redlands, Calif.; John H. Drengberg, 1370 Los Flores Drive, Eagle Rock, Calif.; John D. Lyons, Jr., Route 1, Box 6, Tucson, Ariz.; Otto McCreary, Agricultural Hall, University of Wyoming, Laramie, Wyoming (all proposed by W. Lee Chambers); and Charles Homer Cooper, Elk Grove, Sacramento Co., Calif., proposed by Harold Michener.

Dr. Miller reported that plans for the Annual Meeting were progressing satisfactorily. Major Allan Brooks, at the request of President Chambers, gave a short talk and expressed pleasure at being able to attend a Cooper Club meeting after so many years since the last such opportunity.

Dr. Miller, the speaker of the evening, told in his entertaining manner of the fossils found in the asphalt deposits of Carpinteria, California; and he pointed out some of the differences between the animal and plant remains found in the three known deposits of the kind, at Carpinteria, Rancho La Brea (Los Angeles), and McKittrick. From the plant remains at Carpinteria, which include both staminate and pistillate flowers of mistletoe and pine, and other flowers, seeds, leaves and stems so perfectly preserved that even the fine hairs still remain, it is concluded that the climate there was more humid than at present—climate and vegetation much like those now at Pacific Grove. The birds represented were mostly land birds —California Peacock, California Quail (almost exactly like the one of today), hawks, eagles, some long-legged waders, one goose, and two ducks. The complete absence of gulls was remarked on by Dr. Miller as one of the unexplainable fea-

tures of all three of these asphalt deposits.

Dr. Bishop suggested that Major Brooks and Dr. Miller imitate some bird notes for the audience. The notes of the various forms of owls received the greatest measure of attention, perhaps because of the lateness of the hour. Adjourned.—HAROLD MICHENER, *Secretary.*

THIRD ANNUAL MEETING OF THE COOPER ORNITHOLOGICAL CLUB

At San Diego, California, on Friday to Sunday, May 4 to 6, 1928, was held the Third Annual Meeting of the Club at large. Mr. Clinton G. Abbott, Director of the San Diego Museum of Natural History, Mr. Laurence M. Huey and Mr. Albert M. Ingersoll constituted the committee of arrangements, and to their efforts the success of the meeting was largely due. This was the first time the club ever met outside the narrow precincts of the two Divisions. From forty to one hundred persons were in attendance at the scientific sessions on Friday and Saturday; about sixty attended the dinner, and about twenty participated in an excursion by boat to North Coronado Island on Sunday.

The scientific sessions were held in the lecture room of the San Diego Museum of Natural History in Balboa Park. The meeting was called to order on Friday morning by Dr. Loye Miller, president of the Board of Governors, and after receiving greetings from Dr. Abbott and reading greetings from out-of-town members the scientific program began, with W. L. Chambers, President of the Southern Division, in the chair. Dr. Alexander Wetmore related his experiences as "An Ornithologist in Hispañola", Haiti and Santo Domingo having been the subject of intensive study by him in 1927. A notable feature of his expedition was the discovery of some entirely new forms of birds in the mountainous areas of this island although these had already been extensively hunted over by ornithologists. T. I. Storer discussed "Season Effects of an Arid Region on the Avifauna", pointing out some of the adjustments which birds are forced to make in the American southwest in order to exist there. Joseph Dixon in an excellently illustrated talk on "The Surf-bird's Secret" related his experiences in finding the long sought for eggs of this bird in the Mount McKinley region of Alaska. The gradual narrowing of the possible area for nesting as a result of successive field expeditions was pointed out. As with various other shore birds the male incubates.

At the end of the morning program a visit was made to the aviaries of the Zoological Society of San Diego under the direction of Henry T. Staats, Jr., where opportunity was had to see many exotic birds and, of particular interest, a nest of the Brush Turkey.

Following luncheon in the restaurant of the Zoological Gardens, the afternoon session, under the chairmanship of George Willett, began. Resolutions were offered on the death of the mother of Donald R. Dickey and on the death of Willian Leon Dawson. The program began with discussion of "A Problem of Animal Distribution in Southeastern Arizona", by H. S. Swarth, the problem pertaining to the intangible barrier to birds and mammals encountered in the neighborhood of the Santa Rita Mountains. Joseph Grinnell discussed the "Systematics of Some Western Birds", including the lumping of the eastern and western wood pewees as subspecies of one species, the recognition of eastern and western races of the Olive-sided Flycatcher, and recognition of a new and migratory race of the Nuttall Sparrow. These items provoked extensive discussion showing a decided difference of opinion among those present as to what should be the specific and subspecific status of the several forms in the genus *Zonotrichia*. "The Molts of the Loggerhead Shrike", by Alden Miller, was summarized by Loye Miller. Under the title "Where Engineer and Ornithologist Meet", Harold Michener pointed out the difficulties with high tension electrical transmission lines due to bird droppings on the insulators and told how the power companies in southern California had expended approximately $100,000 before being able successfully to protect their towers against short circuiting by birds. C. G. Abbott gave "A Glimpse of Some British Birds" through excellently colored lantern slides from negatives made by himself some years previously in the British Isles.

Following a dinner at 6:30 p. m. at the University Club the annual meeting of the Board of Governors was held. The reports given at the meeting showed the Club to be in excellent financial condition. Steps are being taken toward incorporation so that the organization may receive bequests for increase of the Endowment Fund which now amounts to upwards of $10,000. D. R. Dickey resigned as Endowment Secretary. The present officers

of the Board and Editors of *The Condor* were reëlected. Dr. Alexander Wetmore was elected as an honorary member of the Board.

The Scientific session on Saturday morning, with J. E. Law presiding, opened with an illustrated account of "The Family Life of the Willow Ptarmigan" as studied by Joseph Dixon in the Mount McKinley region of Alaska. W. H. Thorpe talked on "The Roosting Habits of the Tree Creeper". This, the European subspecies of *Certhia familiaris*, has been found to roost in small compartments in the bark of *Sequoia gigantea* planted in the British Isles since 1853. It is presumed that the birds excavate their own night-time roosting places. A paper by Alden Miller on "The Cardinal in Southern California" (read by T. I. Storer) pointed out the possibility of increase of this species in the south. Incidentally, the members present at the meeting were able to see a live Cardinal in Balboa Park, presumably the bird previously reported by F. F. Gander in *The Condor*. J. G. Tyler discussed "Bird Killing Campaigns", pointing out the serious results likely to proceed from activities of certain ranchers and chambers of commerce in the San Joaquin Valley if their present viewpoint regarding damage by birds is permitted to continue unchallenged. Considerable discussion followed this paper. J. McB. Robertson, under the title "Is *Zonotrichia leucophrys nuttalli* migratory?", told about the capture in successive years of birds probably referable to the subspecies described by Joseph Grinnell the previous afternoon. Loye Miller in a brief discussion of "The Songs of Owls" stated that an owl may be called up to the observer by imitating its notes during the breeding season whenever the observer is within the "territory" of any particular bird. Experiences with the Great Horned Owl, Spotted Owl, Sahuaro Screech Owl and Pigmy Owl were cited in support of his thesis. Miss Hildegarde Howard discussed "Prehistoric Bird-remains from the San Francisco Bay Region", her remarks being based on material from the Emeryville Shell Mound. She drew an ecological picture of the bird life which inhabited the region during the period of Indian occupation.

Dr. Charles H. Townsend of the New York Aquarium spoke extemporaneously on a recent successful expedition under his guidance to the Galapagos Islands whence he brought 180 giant land tortoises which are to be distributed to various centers in North America in the hope of getting the animals to breed in captivity and thus to save the type from extinction.

A noon luncheon was served in the Japanese Tea House, after which a special exhibit of the work of Major Allan Brooks, arranged by Mr. Harry Harris, was visited. A group photograph was at this time taken on the steps of the Fine Arts Building.

The afternoon session on Saturday was presided over by Clinton G. Abbott. The opening paper on "Bird Banding in the West", by J. McB. Robertson, summarized results obtained by banders in various parts of the western United States. The dispersal of ducks from various breeding grounds and the seasonal variations in capture of crowned sparrows at the speaker's own station were shown by large charts. Recapture of individual birds at localities other than those where originally banded was reported in many instances. E. L. Sumner, Jr., gave an illustrated talk entitled "Notes on the Development of Young Golden Eagles", detailing the history of a nest near Pomona and showing that in the later stages of development the eagles suffered a temporary decline in weight before leaving the nest. H. S. Swarth presented motion pictures entitled "Natural History Features of the Galapagos Islands" made on an expedition to those islands by Captain G. A. Hancock, the films exhibited being by J. R. Slevin. Joseph Grinnell discoursed briefly on the relation between "Linnets and Dandelions" as observed about dwellings and on lawns in Berkeley. A composite film entitled "California Game and Song Birds", embodying material by D. R. Dickey, E. S. Cheney and H. C. Bryant, was presented by the latter. A film entitled "The Sport of Bird Banding", illustrating the operations of Mr. S. Prentiss Baldwin in connection with the Bird Research Laboratory at Gates Mills near Cleveland, Ohio, was presented by Miss Blanche Vignos.

On Saturday evening at the U. S. Grant Hotel, the annual dinner was held, and this was followed by brief remarks in happy vein from many of those present, under the stimulating toastmastership of L. H. Miller. The excursion on Sunday provided opportunity for a group to visit the nesting places of sea birds on North Coronado Island.—T. I. STORER, *Secretary, Board of Governors.*